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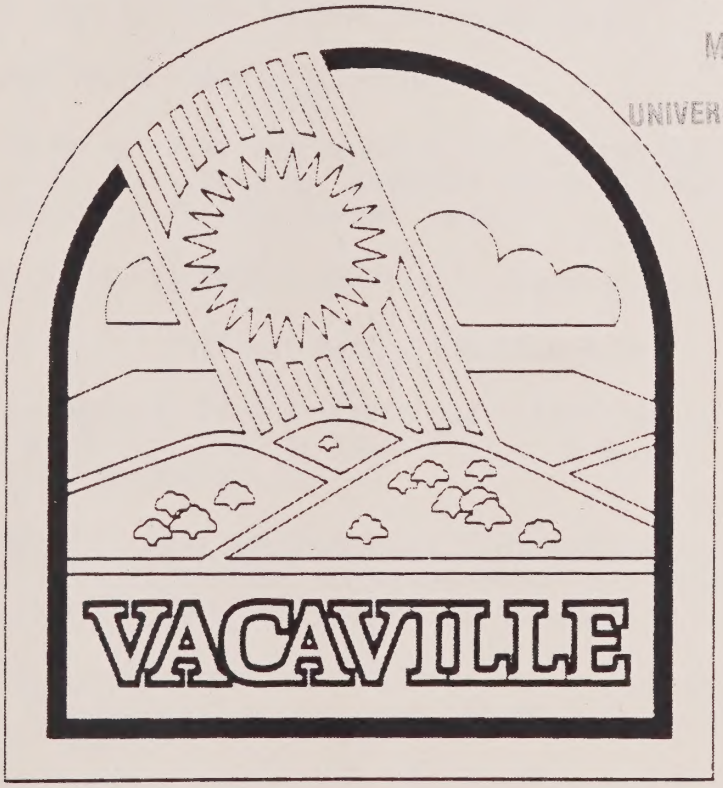
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Proposed Vacaville General Plan

Volume Three: Environmental Impact Report

SCH#89022819

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Blayney-Dyett, Urban and Regional Planners

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August 21, 1990

ERRATA SHEET
PROPOSED VACAVILLE GENERAL PLAN - VOLUME III
DRAFT ENVIRONMENTAL IMPACT REPORT

Volume Four of the Proposed Vacaville General Plan, the addendum containing responses to comments received on the Draft EIR, contains numerous text changes and additions to the Draft EIR. In addition to those changes, the minor text corrections listed on this Errata Sheet have been identified.

1. p. 1-4, paragraph one, last sentence, revise to read:

   "... sewage treatment capacity, visual quality, regional parks and biotic resources..."

2. p. 1-5, paragraph one, add a last sentence:

   "The City will be also implementing any applicable measures required as part of an adopted Air Quality Plan for the Sacramento area."

3. p. 1-5, paragraph three, revise to read:

   "Mitigation. Noise barriers are required for new residential development. Caltrans should be encouraged to construct noise barriers to protect existing residential neighborhoods from freeway noise."

4. p. 1.6, add the following text immediately before section 1.2.:

   "Parks and Recreation - Regional Park. (Section 4.5)

   The loss of the Regional Park's scenic and visual character which derives, in part, from its rural setting, is identified as a severe impact, with only partial mitigation possible.

   Mitigation. Proposed Plan policies seek high quality standards of design which reflect environmental and other concerns. The Plan requires that a visual corridor to the Park and lake be maintained."

5. p. 1-7, Section 1.3, this section shall incorporate a summary of the following text (which is incorporated within page 133 of DEIR per Volume Four of the Proposed General Plan):

   "The General Plan update process conducted by the City of Vacaville included consideration of several alternative land use configurations which were titled "Sketch Plans A, B and C". The three sketch plans were developed by the City's consultant Blayney-Dyett in response to public input received during the initial stage of the update process. The sketch plans were intended to depict alternative general directions and rates of growth for the City as well as alternative land uses for individual properties. The sketch plans were not intended to be absolute "all or nothing"" options. It was clearly indicated that the final adopted General Plan could be similar to one of the sketch plans or it could include elements taken from each plan.

The General Plan Committee sponsored a two hour cable television program to inform the public about the sketch plans which was rebroadcast numerous times. Presentations were also made to numerous community organizations and interest groups. The Committee additionally held a total of eighteen public meetings to gather public input about the sketch plans and options for the new General Plan. All interested persons were heard as part of those meetings.

The General Plan Committee reviewed each sector of the City and received a staff report and public input on each parcel or area where there were alternative land uses proposed. Based on the input received the Committee made initial land use determinations for each sector and parcel through the use of "straw votes". In this manner the Committee constructed a land use plan that reflected the majority opinion of the group.

The General Plan Committee did not choose to recommend any of the three sketch plans as proposed and instead developed a balanced land use diagram that contained elements of each sketch plan. The Committee indicated concerns with Sketch Plan "A" for a number of reasons that included development of the Vaca Valley area north of Alamo Creek and limited development east of Leisure Town Road. Sketch Plan "B" concerns included limited residential development and industrial parks in Lagoon Valley and extensive growth east of Leisure Town Road. Concerns with Sketch Plan "C" included a residential expansion inadequate to meet the City's "fair share" of regional housing needs and reliance on a higher density residential development pattern.

The combination of land uses that received straw vote acceptance by the General Plan Review Committee were combined into a single land use diagram as part of the Proposed General Plan. The Committee made it clear that the proposed plan did not represent a final decision on land use. The Proposed Plan was intended to be an expression of the preliminary consensus of the group that would be subjected to detailed analysis through an Environmental Impact Report and lengthy public scrutiny."

6. p. 2-12, add the following paragraph after paragraph one:

"The Proposed Plan is consistent with the existing policies of YSAPCD and SACOG. However, as is mentioned later in this document, an air quality plan is in preparation for the Sacramento air basin. The Proposed Plan will require LAFCO to consider an amendment to the City's sphere of influence and Comprehensive Annexation Plan."

7. p. 3-21, Section 3.1, add a third paragraph:

"The purpose of this EIR is that it serve as the environmental documentation for adoption of the Proposed General Plan, amendment to the sphere of influence, amendment to the Comprehensive Annexation Plan, adoption of a phasing plan, approval of an agreement between the City and Solano Irrigation district for provision of water to the urban area and all other related actions. It is not intended that this EIR serve as the environmental documentation for specific development proposals."

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DRAFT

PROPOSED VACAVILLE GENERAL PLAN

Volume 3: Environmental Impact Report
SCH #89022819

May 1990

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1. Summary

1 SUMMARY

This Draft Environmental Impact Report (DEIR) evaluates the potential impacts of adoption and implementation of the Proposed General Plan for the City of Vacaville. The DEIR evaluates the changes that will occur to reach build-out in Vacaville and compares the changes to the existing conditions in 1989 -- the reference point for the General Plan Update -- and to changes that would occur with current Plan policies. Thus, the "Project" analyzed in this document is the cumulative change in conditions in the City from the existing environmental setting as well as from the differences attributable to changes in Plan policies.

The "Project" is buildout of the City of Vacaville consistent with policies of the proposed General Plan. Both the Proposed General Plan and the Draft Environmental Impact Report are available through City offices, and will be circulated for review prior to public hearings. The City of Vacaville is the sole agency that is expected to use the EIR directly in its decision-making. The EIR also will be a reference document for actions of the Solano County Local Agency Formation Commission (LAFCO) on sphere of influence boundaries, and requests for annexation and actions by the Solano Irrigation District (SID) on water service policies. However, the basic purpose of the EIR is for use in the process of a comprehensive revision of the City's General Plan. LAFCO decisions will be based on a separate environmental review process.

The objective of the Proposed Vacaville General Plan is to establish a basis for City decisions on development applications and public and private programs over the next 20 years. The emphasis is on physical development and related programs. Plan policies will serve as the basis for revisions to the City's Zoning Ordinance and other regulations, for negotiation and execution of an agreement with SID on water service policy, and for preparation of the City Capital Improvements and Public Facilities Finance Programs policy plans and specific plans for specified geographic areas. The General Plan emphasizes policies that will govern development of the remaining sites in and adjacent to the City that are vacant and are believed to have development potential, and assigns land use. Certain lands are designated to remain in agriculture and open space. The setting section of the General Plan describes the Plan's themes as the preservation of Vacaville's small-town feeling and neighborhood character, preservation of agriculture and open space, and provision for economic development and new housing and recreational opportunities.

An estimate of residential, commercial and industrial additions anticipated under General Plan policies is presented in Table 1.0-A. The residential additions will increase the 1989 housing stock by 200 percent. Because of a projected reduction in average household size, the corresponding increase in population will be only 174 percent. Population, housing, and jobs are shown in Table 1.0-B.

TABLE 1.0-A
PROPOSED GENERAL PLAN
RESIDENTIAL, COMMERCIAL AND INDUSTRIAL ADDITIONS
1990-2010

	Total Residential Units	Residential Units		Commercial	Industrial
		Single Family	Multi Family	Acres	Acres
North of Freeway	7,590	5,423	2,167	698.2	824.6
South of Freeway	12,274	8,338	3,936	785.8	308.6
Total	19,864	13,761	6,103	1,484	1,133.2

TABLE 1.0-B
PROPOSED GENERAL PLAN:
POPULATION, HOUSING AND JOBS

	Existing (1989)	Buildout (2010)	Percent Increase
Household Population	62,950[a]	109,300[e]	174
Housing Units			
Single-Family	13,418	27,180	203
Multi-Family	5,280	11,380	215
Other[b]	2,329	3,490	150
Single-Family Share	63.8%	64.6%	.8%
Average Annual Growth Rate, 1990-2010	--	3.5%	--
Total Potential Jobs[c]	17,390	60,710	349
Ratio of Jobs to Employed Residents[d]	0.56:1	1.21:1	--

Notes: [a]Estimate for April 1, 1990, based on Department of Finance estimate for January, 1989.

[b]Mobile homes and retirement residential (Leisure Town).

[c]Existing from ABAG *Projections '90*; building estimate from land use.

[d]Assume 0.495 employed residents per household resident.

[e]Assume midpoint of each residential density range. With development at the high end of the density range, the population at buildout would be 117,500 while at the low end of the density range the (buildout) population would be 102,000.

1.1 SUMMARY OF SIGNIFICANT ADVERSE IMPACTS

Preparation of a General Plan is, in itself, an environmental review process. Consequently, much of the information in the Environmental Impact Report (EIR) is drawn from working papers prepared for the General Plan, and the General Plan itself is designed to incorporate mitigation for adverse impacts that might otherwise occur. However, impacts on traffic conditions, air quality, agricultural and open space resources, noise, water supply, sewage-treatment capacity, and biotic resources remain significant.

Traffic, Streets, and Highways. (Section 4.1)

Vacaville development in accord with the General Plan would contribute to projected increased volumes on Interstate 80, exceeding its desirable capacity, but alternatives to the Plan (except for maintenance of existing conditions) would not significantly mitigate this impact.

General Plan policies strive to maintain Level of Service (LOS) C or better on all streets and at all intersections, with LOS D a standard for infill or isolated conditions. Where improvements to achieve LOS C or D are infeasible because of excessive cost or disruption, the City Council may accept LOS E or F for infill areas or isolated conditions if certain prescribed findings are made.

Mitigation. The LOS standards established by the General Plan are at the discretion of the City. Local improvements to the circulation system, recommended in Section 4.1 of the EIR, also should be considered to improve the traffic-carrying capacity of City streets. Interstate 80 improvements will require regional decision making.

Air Quality. (Section 4.2)

Ozone, a pollutant to which motor vehicle emissions are a major contributor, is projected by the California Air Resources Board to decline in the region as motor vehicle emissions remain stable or decline between 1987 and 2010. In the Vacaville Planning Area, national ozone standards have not been exceeded over the past 8 years. However, with Plan implementation, motor vehicle emissions are projected to increase. This does not mean that the proposed General Plan is inconsistent with the Sacramento Air Quality Maintenance Plan because regulating stationary industrial sources is more efficient than regulating the location of development. Most growth not accommodated in the Planning Area would be redistributed elsewhere in the Bay Area or Sacramento Valley, contributing to basin-wide pollution.

Mitigation. Stationary sources of air pollutants are regulated by Yolo-Solano APCD. If annual monitoring shows unsatisfactory ozone levels, appropriate mitigation would be implementing more ambitious transportation system management (TSM) measures than are included in the proposed General Plan in order to further reduce auto trips, or adoption of a statement of overriding considerations.[1]

Noise. (Section 4.3)

Projected traffic increases would subject certain unshielded residential areas to noise levels above the 60 Ldn (day/night decibels) normally acceptable standard.

Mitigation. The feasible mitigation where sound walls cannot be built would be technical or financial assistance to enable owners to modify dwelling units to meet the 45 Ldn standard for habitable rooms.

Visual Quality/Community Image and Form. (Section 4.4)

The character of the City will change with development under the proposed Plan, but Plan policies will partially mitigate visual impacts through policy plans, urban separators, and protection of steep slopes and ridgelines.

Mitigation. Attention to visual analysis in policy plans will help mitigate impacts on visual quality.

Water Supply and Distribution/Wastewater Collection and Treatment. (Section 4.5)

Projections indicate that demand will exceed currently available water supplies, and water and sewer system capacity. However, the Plan calls for updating the water and sewer master plans, creating new water storage reservoirs, and enacting regulations requiring water conservation on more than a "standby" or emergency basis.

---

[1]CEQA Guidelines (Section 15093(b)) state: where the decision of the public agency allows the occurrence of significant effects which are identified in the final EIR but are not at least substantially mitigated, the agency shall state in writing the specific reasons to support its action based on the final EIR and/or other information in the record.

Mitigation. New water supplies and improvements to the water and sewer service infrastructure and plant expansion will have to be made some time in the next 20 years, or development consistent with the buildout of the Plan could not occur. An expanded conservation program could allow development to serve a population above 90,000, but infrastructure improvements (new supplies and storage) will be necessary for full development.

Conversion of Open Space and Agricultural Land. (Section 4.6)

Proposed General Plan policies would result in residential development in existing open space and agricultural areas. Some of this land is classified as prime agricultural land, and to convert it to urban use is a significant adverse environmental impact.

Mitigation. The proposed agreement between the City and the Solano Irrigation District (SID) included in Appendix 3 will mitigate long-term effects by establishing a limit for urban expansion for 10 years in the West Valleys and for 20 years east of Leisure Town Road.

Biotic Resources/Species of Special Status. (Section 4.9)

Proposed plan policies would result in conversion of land now functioning as habitat to urban land uses. This loss of habitat is expected to result in crowding of mobile animal species, the destruction of non-mobile species, the likelihood of attendant loss in total numbers and kinds of animal species, and a loss of plant species. In addition, species of special status which are being considered for Federal listing as Endangered or Threatened are present in the Planning Area.

Mitigation. Proposed plan policies will reduce the impacts of open space/agricultural land conversion, indirectly preserving habitat, and project-specific environmental review is anticipated to identify appropriate additional mitigation.

1.2 IMPACTS NOT FOUND TO BE SIGNIFICANT

Airports. (Section 4.1) Plan policies provide adequate mitigation and the General Plan Diagram shows what land is within the airport land use compatibility districts and thus subject to special review.

Schools. (Section 4.5) School sites are needed for the equivalent of 12 new schools, including a high school, and the Plan provides authority for reserving them. The school districts have authority to secure school financing, and Plan policies call for the City to cooperate on joint financing programs, if requested and appropriate.

Parks and Recreation. (Section 4.5) The Plan would provide five acres of parkland per 1,000 residents. Trails proposals would affect wildlife habitat but these impacts can be partially mitigated by sensitive design. Conservation Element policies also call for habitat preservation and provision of wildlife corridors.

Public Services (Solid Waste Disposal, Police and Fire Protection). (Section 4.5) Although the Plan will increase demand for community services, Plan policies provide adequate mitigation by requiring that performance standards be set and adequate public facilities and services be assured before new development can occur.

Geologic and Soils Hazards. (Section 4.7) Plan policies provide adequate mitigation.

Hydrology. (Section 4.8) Plan policies reduce runoff to 90 percent of pre-existing runoff in development in the Alamo Creek area. These policies, together with the provision of four upstream detention reservoirs, will substantially reduce flood risk.

Historical and Archaeological Resources. (Section 4.10) State Law protects "unique" historic and archaeological resources. Local sites and buildings of historic interest are protected by a historic district.

1.3 ALTERNATIVES -- SUMMARY

The California Environmental Quality Act (CEQA) requires that environmental consequences of alternatives to the project be discussed in the Plan EIR. Five alternatives to the proposed Plan are evaluated in Section 5: the "No Project" Alternative, which preserves existing conditions, buildout of the existing (1980) General Plan (with all approved amendments); and Sketch Plan Alternatives A, B and C, discussed in *Working Paper 2: Analysis of Alternative Sketch Plans*. Table 5.1-A summarizes the development potential for each alternative, projected to 2010.

The major differences between the proposed General Plan and all the alternatives are:

- An increase in the amount of housing available in the Planning Area. Because a broad range of housing densities is proposed, this will increase the amount of "upper-end" housing as well as affordable housing.

- A higher percentage of land preserved in open space than in any of the Sketch Plan alternatives other than Plan C, the 1980 General Plan, or maintenance of existing conditions.

- More commercial and business park development, but significantly less industrial development than in any of the alternatives. This will broaden the city's economic base and offer opportunities for new businesses not now represented in the City.

1.4 ISSUES TO BE RESOLVED AND MAJOR AREAS OF CONTROVERSY

The EIR will be used during the General Plan hearing process to help decide whether the City should modify the Project to avoid negative impacts, adopt the Draft Plan with suggested mitigation, or adopt the Draft Plan without mitigation following findings of overriding consideration that would justify the acceptance of significant impacts.

Issues relating to potentially significant impacts are:

- **The location of new development outside the City limits and the 1980 planned urban area**: Should any expansion occur on prime farmland, farmland of statewide importance or unique farmland east of Leisure Town Road or west into Lower Lagoon Valley or the Cherry Glen area north of I-80? Will Vacaville be able to retain its distinction and self-image as a free-standing community, and its separation from Fairfield, with urbanization in the West Valleys?

- **Preservation of farmland**: Is the proposed urban service area boundary adequate to provide opportunities for continued viable agricultural production within the Planning Area and still meet regional housing needs?

- **Acceptable levels of traffic service:** Are the provisions to allow LOS D or worse under special circumstances acceptable? Is it reasonable to expect a 30 percent reduction on peak-hour trips with implementation of TSM programs by major employers? Should other measures be imposed, or should the planned intensity and extent of future development be reduced?

- **Air Quality:** Are the proposed transportation policies and TSM requirements adequate to achieve and maintain air quality standards? Can additional mitigation be justified in the absence of an air quality model showing what specific control measures are needed to achieve and maintain standards?

- **Biotic resources:** Are Plan policies to preserve creeks and related riparian habitat, hillsides and ridges as open space sufficient or should additional mitigation and monitoring be imposed? Are there additional sensitive species present in the Planning Area?

- **Other environmental hazards:** Do Plan policies provide sufficient protection from geologic and seismic hazards, flooding, fire hazard, hazardous materials and disasters?

These issues are more fully described in the body of the EIR.

1.5 MITIGATION REPORTING AND MONITORING

State planning law requires an annual report on implementation of the General Plan (Government Code Section 65400). In addition to explaining what progress has been made under each element, this report also should provide details on mitigation proposed in this EIR that is accepted by the City and incorporated into the General Plan, policy plans, capital improvement programs, development regulations or the City's administrative procedures. Because many Plan policies are in themselves mitigation measures, a status report on Plan implementation should serve to meet CEQA requirements for mitigation reporting.

In the Land Use Element, the General Plan calls for monitoring development where infrastructure limits are being reached (Policy 2.2-I10). Additional monitoring of potential impacts on environmental resources should be required as a condition of policy plan approval where new development may have an adverse impact on wildlife habitat or other sensitive resources.

Finally, as part of the environmental review process for specific development proposals, the City will impose a mitigation reporting and monitoring requirement if circumstances warrant.

2. *Introduction*

2 INTRODUCTION

2.1 EIR APPROACH

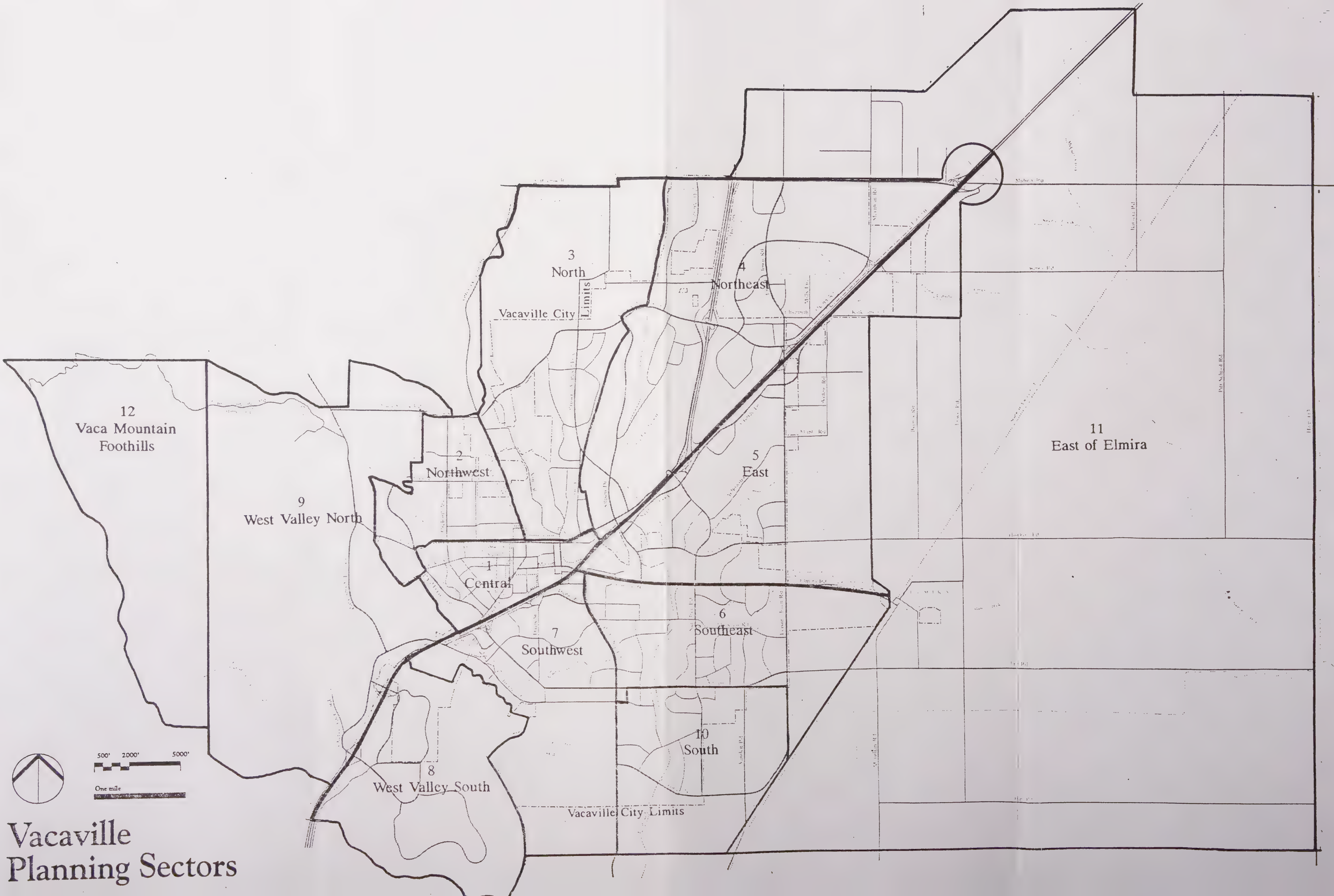
This Draft Environmental Impact Report (DEIR) evaluates the probable environmental effects of the City of Vacaville's Proposed General Plan as required by the California Environmental Quality Act (CEQA) and California EIR Guidelines. According to CEQA, the anticipated environmental impacts of the proposed General Plan should be measured against existing community conditions in addition to the not-yet-attained buildout of the current General Plan (in this case, the 1980 General Plan and subsequent amendments).

According to guidelines prepared by the Governor's Office of Planning and Research,[2] the contents of a General Plan EIR should include:

- Project description;
- Environmental setting;
- Significant environmental impacts, including cumulative impacts;
- Mitigation measures;
- Alternatives to the project;
- Relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity;
- Growth-inducing impacts.

CEQA also calls for a thorough, interdisciplinary analysis of such issues as air quality, land use, and water quality. However, since the proposed General Plan covers a wide range of planning issues, the General Plan EIR will necessarily discuss them in more general terms than would the EIR for a specific development project.

Most impacts are described for the Vacaville Planning Area as a whole, which includes lands within the City boundaries and the City's Sphere of Influence as well as land outside the Sphere of Influence. Some tabular data and impact evaluations are specific to planning sectors as illustrated by Figure 1. The regional location of the Planning Area is illustrated in Figure 2.



Vacaville Planning Sectors

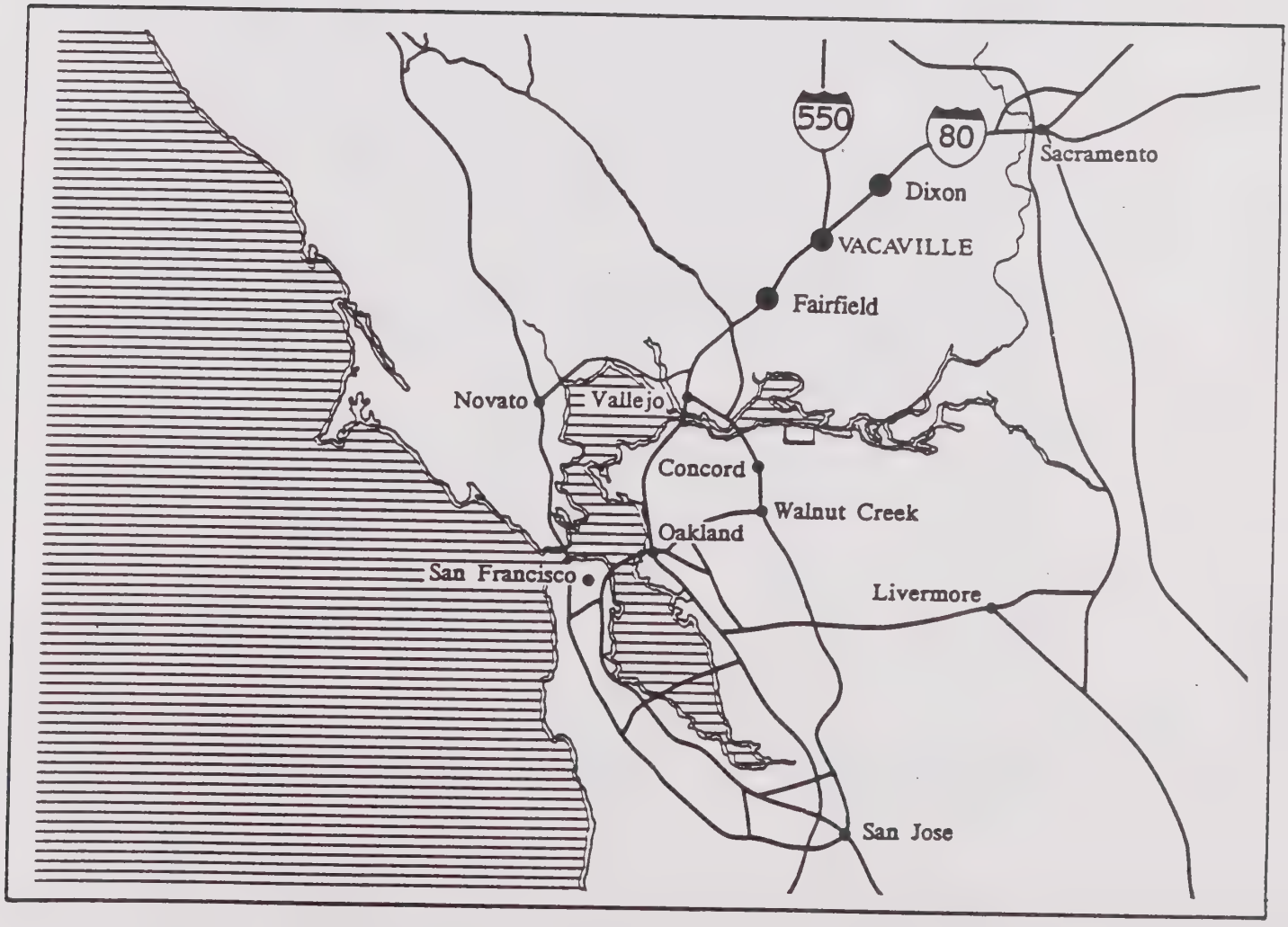


Figure 2: REGIONAL LOCATION

2.2 RELEVANT PLANS AND AGENCIES

The proposed General Plan has been reviewed for its relation to and compatibility with several related plans: the Solano County General Plan, the City of Fairfield General Plan, and the Sacramento Air Quality Maintenance District Plan. The Solano County General Plan controls land use north, south, and east of the City limits; Fairfield controls land to the west.

Solano County General Plan. The Land Use Element of the Solano County General Plan proposes land-use designations in the northwest, northeast, and south sectors of the City's Planning Area which conflict with the proposed General Plan. For example, the County Plan envisions agricultural land use in the West Valleys, while the City's proposed General Plan designates portions of these planning sectors for golf-course residential and business park development. Land use to the east of the City shown for residential development is shown as intensive agriculture on the County's plan.

To preserve the identity of communities within the County, community separators are proposed in the County Plan between Vacaville and Fairfield. This is consistent with the proposed General Plan, which does call for a similar separator.

The County's present land use plan adopted in 1980 designates most of the areas surrounding the City for agriculture and open space uses. These designations were confirmed by the voters in 1984 when an initiative (Proposition A) was passed, limiting the method by which agricultural conversion can take place. In 1988, the County undertook two studies to redesignate open space areas to Highway Commercial and Rural Residential uses. These proposals were referred to the voters as required by Proposition A. Both were rejected by the voters in November 1988.

To ensure that development in the I-80 corridor is compatible with both City and County plans, the County also has proposed preparation of a Corridor Design Plan.

Fairfield General Plan. The Land Use Element of the Fairfield General Plan envisions open space along the ridge that separates Lagoon Valley from Fairfield, and residential development to the south. This is consistent with the County's proposal for a community separator between the two cities. The City of Fairfield currently is updating its General Plan, so more specific proposals may be forthcoming.

Yolo-Solano Air Pollution Control District. The Yolo-Solano Air Pollution Control District (YSAPCD) is responsible for monitoring and enforcing standards in the Planning Area. The California Clean Air Act adopted in 1988 requires each APCD to prepare a county air quality plan which shows attainment of state and federal air quality standards for ozone, carbon monoxide and sulfur dioxide by the earliest possible date. The plan must be submitted to the California Air Resources Board by 1991.

Under a separate air quality planning program, the Sacramento Area Council of Governments (SALOG) was given responsibility for preparing an Air Quality Management Plan (AQMP) which establishes policies and programs to implement state and federal standards, and recommend policies for local governments. This plan was originally adopted in 1982 and is currently being updated.

Programs to reduce hydrocarbon emissions, precursors of ozone, include: use of available control technology on existing sources; new source review for new stationary sources; the motor vehicle inspection and maintenance program; and transportation system improvements. At the local level, the AQMP identifies the land-use and growth decisions embodied in the General Plan as being of vital importance in air quality protection. An Interim Air Quality Plan, prepared by SACOG, has identified a broad list of actions for local governments, including Vacaville. However, this plan has not shown what actions are necessary to achieve and maintain air quality standards. This will require completion of an air quality model scheduled for 1992. The City of Vacaville has not acted on the Interim Air Quality Plan as of the date this Draft EIR is written.

2.3 FRAMEWORK

A comparison of population and economic growth assumed for the 1980 General Plan with current growth projections prepared by the Association of Bay Area Governments will place the Proposed Plan in context. This is particularly important for an understanding of Vacaville's role as a regional housing provider and employment center.

Current Population and Economic Growth. The City currently has an estimated household population of 62,950, excluding the resident population at the California Medical Facility (CMF) located in the South Sector of the City. The 1980 General Plan was geared to an average annual rate of development of 750 housing units, consistent with the Growth Management Program the City has

adopted. An additional 37 units were assumed to be exempt each year, and the resident population of the California Medical Facility (CMF) was expected to stabilize at 2,000 inmates. Table 2.3-A shows the projections of dwelling units and population for 1995 and 2000 which resulted from these assumptions.

TABLE 2.3-A
1980 VACAVILLE GENERAL PLAN
DWELLING UNIT AND POPULATION PROJECTIONS

	1995	2000
New Dwelling Units (Average Annual Rate)	787	787
Total Dwelling Units	27,130	31,065
Average Persons per Unit	2.72	2.50
Household Population	63,090	77,663
CMF Resident Population Assumed	2,000	2,000
Total Population	65,090	79,663

Source: Vacaville 1980 General Plan.

The 1980 General Plan did not anticipate the major expansion of the California Medical Facility. With completion of CMF South, the inmate population has increased to around 8,000. When this additional population is added to the 1980 General Plan's projections of total population, the result is that the projections rather closely match recent population projections prepared by the Association of Bay Area Governments (ABAG).

2 *Preparing an Environmental Impact Report for a General Plan*, February 1983.

The 1980 General Plan projected higher population growth than ABAG did in *Projections '79*. Specifically, as Table 2.3-B shows, ABAG has increased the household-population projection for Vacaville in 2000 by about 20 percent, from 69,330 to 83,500. The employment projection has more than doubled, from 11,866 to 27,800 jobs. Vacaville also is capturing an increasing share of growth in the County. Thus, from a regional planning perspective, far greater growth is now anticipated in Vacaville than was projected by ABAG in 1979.

The 1990 General Plan Update has two planning horizons: 1995 and 2010. The long-term perspective is needed to ensure that infrastructure improvements will accommodate future growth; the short-term horizon will help establish specific priorities for implementation. The 1990-95 planning period also is consistent with the City's obligation under State Law to plan for its "fair share" of regional housing needs.

ABAG's *Projections '90* provides the most current baseline reference for future planning. While local actions may influence the timing and location of growth, ABAG's projections provide a framework for making these choices. Table 2.3-C summarizes population and employment expected in Vacaville in 1995 and 2010, and the net additions over the five- and 20-year planning periods.

TABLE 2.3-B
COMPARISON OF ABAG'S POPULATION AND EMPLOYMENT PROJECTIONS

	Household Population	Employment
Vacaville: Year 2000		
Projections '79	69,330	11,766
Projections '85	79,100	22,500
Projections '87	79,000	26,400
Projections '90	83,500	27,780
% Increase 1979-90	+20.4	+36
Solano County: Year 2000		
Projections '79	335,842	80,181
Projections '85	376,800	140,000
Projections '87	388,000	148,600
Projections '90	406,300	160,060
% Increase 1979-90	+21	+00
S.F. Bay Area: Year 2000		
Projections '79	6,205,000	2,833,500
Projections '85	6,298,000	3,651,700
Projections '87	6,457,900	3,713,000
Projections '90	6,442,400	3,706,000
% Increase 1979-90	+3.8	+30.8

Source: ABAG, *Projections '79, Projections '85, Projections '87, Projections '90.*

TABLE 2.3-C
POPULATION AND EMPLOYMENT PROJECTIONS, 1985-2010
VACAVILLE SPHERE OF INFLUENCE

	1985	1990	1995	2010[a]	1990-1995 Change Increase	1990-1995 Change Percent	1990-2010 Change Increase	1990-2010 Change Percent
Population								
Total Population	51,100	66,100	77,500	113,000	11,400	17.2	46,900	71.0
Household Population	46,800	58,400	69,500	104,470	11,100	19.0	46,070	78.8
Households	16,360	21,400	25,850	39,800	4,450	20.8	18,400	86.0
Employed Residents	20,900	27,600	33,900	53,780	6,300	22.8	26,180	94.9
Employment								
Total Jobs	13,110	17,390	23,840	40,080	6,450	37.1	22,690	130.5
Manufacturing/ Wholesale	2,390	3,120	4,510	8,430	1,390	44.6	5,310	170.2
Retail/Service	5,980	7,830	9,780	19,600	1,950	24.9	12,220	156.7
Other	4,740	6,440	9,550	12,050	3,110	48.3	5,610	87.1

[a] Projections from ABAG. 2010 estimates assume same growth rate as for 2000-05.

Source: ABAG *Projections '90*.

Jobs/Housing Balance. In 1980, most Vacaville residents did not work in the City. Many did not commute far, however, as responses to the 1980 census showed that 69 percent of all employed Vacaville residents worked within the Vallejo-Fairfield-Napa Standard Metropolitan Statistical Area (SMSA). The ratio of jobs-to-housing demand in the community for the Planning Area, the County, and other communities is shown below. A ratio of less than one indicates the community does not have enough jobs for all who live there. However, it should be noted that many jobs in Vacaville are filled by residents of other areas, and the necessity to commute is not the primary factor in the choice of where to work.

TABLE 2.3-D
RATIO OF JOBS TO EMPLOYED RESIDENTS

	1980	1985	2005
Vacaville Planning Area	.62	.63	.70
Solano County	.88	.83	.79
Contra Costa County	.52	.68	.76
Fairfield	1.16	1.10	0.98
Concord	.62	.76	1.02

Source: ABAG *Projections '90.*

Most communities in Solano County have a high percentage of residents who commute to work in other parts of the County, as they do in Vacaville. ABAG anticipates less out-commuting in the future as businesses move out to Solano County. However, Table 2.3-D shows that although the ratio of jobs to employed residents will increase, it still will be lower than the averages for Contra Costa and Solano counties and Fairfield and Concord.

Recent studies have shown that housing costs, commute distances, and labor costs are among the top five factors which influence corporate decisions on where to locate. These are among the reasons why corporations have begun to locate at least their back-office operations in the North Bay area, away from the major cities, where the already high costs of housing and the time and expense of commuting are increasing. Much of this movement has been toward central Contra Costa County, especially to Concord and Walnut Creek. These areas are becoming crowded as well, as evidenced by recent moves toward no-growth or slow-growth in these cities. Looking ahead, the large amount of vacant land and low housing costs in Vacaville may help encourage similar businesses to locate there.

Impacts on Population and Economic Growth Under the Proposed General Plan. The Proposed General Plan will accommodate a substantial increase in population, 109,300 household residents at buildout, and employment, 60,700 jobs at buildout. The Plan is intended to serve anticipated growth in the North Bay by providing sites for residential, commercial and industrial development and public facilities. However, the Plan also establishes policies for guiding growth to ensure that public services and facilities are not adversely affected and pace of population and economic growth occurs in an orderly manner. The primary vehicle for accomplishing this is to be a phasing plan, to be implemented by a planned growth ordinance.

Finally, the Plan calls for a mechanism to monitor new development where infrastructure limits are being reached or exceeded so linkages with necessary improvements can be established and funded. Taken together, these policies and implementation actions will constrain population and economic growth, thus limiting the growth-inducing effects of Plan adoption and implementation.

Jobs/Housing Relationships. The relationship between jobs and housing will change over the planning period, with implementation of the land use concepts embodied in the General Plan Diagram. The City will change from a suburban community with a substantial out-commute to a community where there may well be slightly more jobs than employed residents if development occurs as envisioned by the Diagram. Table 2.3-E summarizes these relationships. (The Housing Section of the Plan addresses this subject as well in the context of housing policy and regional housing needs.)

TABLE 2.3-E
JOBS/HOUSING RATIO IN
PROPOSED GENERAL PLAN

	1988[a]	1990[a]	2010[b]
Jobs	13,110	17,390	60,710
Employed Residents	20,900	27,600	54,110
Ratio: Jobs per Employed Residents	0.63	0.63	1.12

Notes: [a]ABAG *Projections '90*.

[b]Blayney-Dyett, Urban and Regional Planners, based on General Plan Committee Land Use decisions.

3. Project Description

3 PROJECT DESCRIPTIONS

3.1 DEFINITION OF THE PROJECT

The "project" under consideration in this EIR is full development, consistent with the proposed Vacaville General Plan, which is assumed to be reached by 2010. Residential development is assumed at the midpoint range of the densities permitted by text policies given traffic constraints on the traffic-carrying capacity of local streets and the requirement that any approval of an increase over a base density be justified by compensating public benefits.

The "setting" described as a basis for impact assessment reflects existing conditions in Vacaville. The built environment and assumed development based on approvals made under the prior (1980) Plan is also considered as a basis for comparison. The "project" represents cumulative development under the proposed Plan consistent with all Plan policies. This means an assumption regarding not only the type and amount of development, but also the character, quality and design of development.

3.2 THE PLANNING PROCESS

The General Plan update was undertaken over an 18-month period with consultant assistance from Blayney-Dyett, Urban and Regional Planners.

This process of Plan design and policy development has sought to minimize the need for mitigation measures to be "added on" rather than "built in" to the Plan. Policies in the Plan provide mitigation for impacts on agricultural areas, hillsides and ridgelines, creeks, traffic, the water system, and other areas of concern. Impact analysis in this EIR assumes that project implementation will be consistent with all Plan policies, including those intended to minimize adverse environmental impacts.

Two prior reports have presented the work of consultants and City staff to the General Plan Committee, composed of members of the City Council, the Planning Commission, and the Parks and Recreation Commission, and to the community at large. These describe existing conditions, list planning issues, analyze options, and compare alternative sketch plans. Community meetings, held following the distribution of each working paper, provided a setting for discussion and input to the General Plan Committee.

The process was designed to consider the impacts of Plan choices as the Plan was developed, and to avoid creating a Plan that would have significant adverse environmental impacts. Potential impacts were first considered in *Working Paper 1: Existing Conditions and Future Prospects; Planning Issues and Options*. At the next step in the process, sketch plans were analyzed based on land-use impacts, demand for community services, traffic, community character, and the natural environment. This second working paper was titled *Alternative Sketch Plans*.

Through the public-participation process, community priorities for the Plan became clear in the early stages of Plan preparation. These included retaining the city's open-space setting with the hillsides as a visual backdrop for the community, protecting prime agricultural land, securing additional water supplies, and regulating land use to minimize future traffic problems. All the Plan alternatives addressed these concerns. At the sketch plan stage, land-use alternatives were evaluated in relation to feasible circulation systems, engineering and fiscal impacts. The proposed Plan, designed subsequent to the sketch plans, has a significant amount of land designated as agricultural and open space.

Mitigation measures identified are those not included in the proposed Plan that would be necessary to prevent significant adverse effects resulting from development in accord with the Plan.

3.3 PROJECT DESCRIPTION

The proposed Plan constitutes a complete Project Description, and the reader should refer to it for a full understanding of all aspects of the project. Table 2-1 in the Plan provides information on the population, housing, employment and the ratio of jobs to employed residents. Table 2-2, 2-3 and 2-4 in the Plan show projected residential, commercial, and industrial development. Major Plan proposals are summarized below.

Overall Growth Strategy. Guiding and implementing policies in the Plan call for a systematic approach to planned growth, consistent with regional housing needs, including requirements for phasing, "policy plans" for new development areas, limitations on development where infrastructure limits may be reached or exceeded, and an average annual residential growth target.

Community Form and Image. To maintain Vacaville's image as a free-standing community surrounded by open space, the Plan designates community separators between Vacaville and Fairfield and Vacaville and Dixon, greenbelt buffers between urban and agricultural uses and open space/agricultural areas.

Programs to strengthen the City's identity are proposed, including preparation of design guidelines for residential, commercial and industrial development and resource protection regulations that establish standards for protection of major ridgelines, creeks and riparian corridors and hillsides.

Residential Development. Buildout of the proposed General Plan would double the housing stock, from approximately 21,000 to 42,000 units. The proportion of single-family units to multi-family units would remain approximately the same. Specific sites are designated for manufactured housing (mobile home) parks, which could provide about 1,800 units of affordable housing. The Plan also identifies two sites for golf course residential communities: one in Lower Lagoon Valley south of I-80 and the other in the Cherry Glen area north of I-80. Finally, the Plan proposes Urban High Density housing, which could add about 700 units adjacent to the Downtown core area.

Retail and Service-Commercial Uses. To serve new development, the Plan proposes approximately 770 acres for neighborhood and community shopping centers and general commercial uses, 690 acres for highway commercial uses, and 110 acres for commercial services. At Plan buildout, the commercial sector would employ 26,000 people.

Industrial and Business Parks. The Plan proposes a new business park on 270 acres in the Lower Lagoon Valley; other industrial and business parks are located in the I-505 corridor and south of I-80. The amount of industrial acreage is less than in the 1980 Plan, but more land is reserved for business park uses.

Urban and Agricultural Service Zones. The plan proposes that two service zones be established: an urban service zone of approximately 24,900 acres and an agricultural service area of approximately 38,600 acres. The City's objective is to maintain as much viable farming on prime agricultural soils as is practical and supportive of regional agricultural production while still facilitating urban growth consistent with regional housing needs and the City's economic development objectives.

Open Space. The City's current policy of prohibiting development on slopes over 25 percent and in hazardous areas is included in the proposed Plan. In addition, specific areas for urban open space are delineated to help shape urban form.

Community Services and Facilities. The Plan designates sites for new schools and parks and a bike and trail system to serve future needs. In addition, the Plan proposes to increase the amount of parkland per capita from 4 acres per thousand residents, which is current City policy, to 5 acres per

thousand residents. Conceptual plans for water and sewer system improvements are presented, and the Plan proposes four new upstream detention reservoirs to reduce flooding potential.

Transportation and Traffic Levels of Service. New streets are proposed to serve new areas of development, and many existing streets will have to be widened to accommodate increased traffic. To ensure correlation between planned land use and the traffic-carrying capacity of the roadway system, the Plan establishes traffic level of service (LOS) standards. To reduce peak-hour congestion to acceptable levels, major employers will be required to reduce peak-hour trips by 30 percent.

Housing. Proposed policies focus on how to provide affordable housing for low- and moderate-income households. These include requirements for new constriction, rehabilitation and conservation of existing housing, household assistance, and program monitoring.

Conservation. Plan proposals address protection of creeks and riparian habitat, wildlife and water conservation.

Safety. This element includes specific policies and maps addressing geologic and seismic hazards, flooding and fire hazards, hazardous wastes and disasters. In addition, the Plan Diagram delineates the airport land use compatibility zones for Nut Tree Airport and Travis Air Force Base.

Noise. Policies and standards for controlling community noise are proposed, and areas exposed to high noise levels are mapped.

4. *Environmental Setting, Impact Analysis, and Mitigation*

4 ENVIRONMENTAL SETTING, IMPACT ANALYSIS, AND MITIGATION

Each of the sub-sections within Section 4 include three mandatory topics: Environmental Setting, Impact Analysis, and Mitigation. The Environmental Setting describes the existing conditions in Vacaville today, and serves as a baseline for comparison with the proposed Plan. The Impact Analysis examines the effects of full implementation of the proposed Plan, from the present until buildout, at 2010. The Mitigation section identifies proposed Plan policies which reduce the environmental impacts of Plan implementation; it may also identify additional measures which provide a greater level of mitigation than can be expected at the General Plan policy level.

Some of the sub-sections within Section 4 also include a discussion of Planned or Proposed Improvements. These improvements may not be specifically proposed as a part of the General Plan, but are in the design stages or under consideration. They thus merit some discussion, but their impacts cannot be accurately predicted until detailed proposals are submitted. It is assumed that such projects will undergo rigorous environmental review on a project-specific basis.

4.1 TRAFFIC AND TRANSPORTATION: STREETS, HIGHWAYS, AND AIRPORTS

The *Technical Report for the General Plan Update Transportation Study*, prepared by TJKM, Transportation Consultants, March 1990, includes details on the traffic model used to analyze the recommended circulation system and the impacts of the land use proposals. This report is included in the Appendix; TJKM's principal findings and conclusions are presented in this section.

Setting: Streets and Highways

The City of Vacaville is bisected by a freeway, Interstate 80. The local circulation system, illustrated in General Plan Figures 6-1 and 6-2, include four-lane arterials (namely Alamo Drive, Merchant Street, Monte Vista, Elmira Road, and Peabody Road) and 2-lane arterials and collector streets.

To measure the ability of the circulation system to accommodate traffic, the City uses a Level of Service (LOS) standard. Appendix 1 includes definitions for each LOS standard, on a scale of A (free-flow conditions) to F (unstable conditions approaching "gridlock"). In the 1980 General Plan LOS C

was selected by the City Council as the level of service to size future facilities. LOS C allows for additional future growth with an adequate comfort zone before the roadway facilities approach capacity. By contrast, LOS D would not allow for future growth beyond the levels assumed in the buildout analysis or changes in existing travel patterns. On the other hand, the cost of providing improvements to meet an LOS D standard is considerably less than those needed for LOS C.

In the older, developed areas, there is not enough right-of-way or pavement width to accommodate widening, so it may be necessary to create non-standard cross-sections to accommodate the necessary lanes. Roadways with right-of-way problems include Nut Tree Road, between Elmira Road and Alamo Drive, and Alamo Drive from Marshall Road to Alamo Lane.

To improve capacity on the City standard four-lane divided arterial section, TJKM recommends that on-street parking should be prohibited and driveway and street access limited (especially at intersections). These recommendations are already in use on Nut Tree Road between Elmira Road and Alamo Drive and can add up to a 20 percent increase in capacity for a roadway. These improvements would increase the capacity (LOS C) of a four-lane divided arterial to 4,200 vehicles per hour.

Proposed Improvements. The roadway improvements recommended to serve existing and future land use under the General Plan are listed in Table 4.1-A and illustrated in General Plan Figure 6-2. The recommended future roadway system is illustrated in General Plan Figure 6-1. The principal new roadways include connections between existing facilities, such as the Vaca Valley Parkway Extension and the California Drive Extension, as well as roadways to serve new areas for development, such as the West Valleys. In addition, a number of facilities are proposed for widening to accommodate increased traffic. The overall objective is to complete a core street system with loops around the city.

Impacts: Streets and Highways

Projected traffic volumes for General Plan buildout with the future roadway network are listed in Table 4.1-A and shown on the Figure 3. This Table also includes projected volumes on I-80 and I-505. The traffic volumes are for the p.m. peak hour and assume a 30 percent reduction in trips from TSM measures, as required by the General Plan policies. The traffic model assumes that there will be a 30 percent reduction in trips from large employment areas such as Vaca Valley Industrial Park, Vaca Valley Corporate Center, and Lagoon Valley. Refer to the Traffic Study in Appendix 11 for additional information. Insert Vacaville Projected P.M. Peak Hour Volumes (Figure 3)



NOTE: ALL VOLUMES ROUNDED TO THE NEAREST 100 VOLUME.

Vacaville - Projected P.M. Peak Hour Volumes

Figure 3

Prepared by: TJKM

I-80 and Interchange Analysis. The analysis of the traffic impacts of the buildout of the current City of Vacaville General Plan indicates heavy impacts to both I-80 and all its interchanges and overcrossings.

TABLE 4.1-A
PROJECTED NUMBER OF LANES ON I-80 AND I-505
WITH BUILDOUT OF PROPOSED GENERAL PLAN

Roadway/Segment	Projected Volume P.M. Peak Hour (VPH)	Projected Lane Needs[a]	Planned Number of Lanes
Interstate 80			
West of Lagoon Valley	32,400 VPH	16	10
Lagoon Valley to Alamo	28,000 VPH	14	10
Alamo to Davis	25,100 VPH	14	10
Davis to Depot	23,100 VPH	12	10
Depot to Monte Vista/Nut Tree	22,900 VPH	12	10
Monte Vista/Nut Tree to I-505	23,900 VPH	12	10
I-505 to Leisure Town	16,900 VPH	10	8
East of Leisure Town	16,774 VPH	10	8
Interstate 505			
I-80 to Vaca Valley	4,200 VPH	4	6
North of Vaca Valley	4,200 VPH	4	6

Notes: [a]Assumes a capacity per lane of 2,000 vehicles per hour.
Source: TJKM Transportation Consultants, March 1990.

The minimum number of lanes needed on I-80 and I-505 to accommodate the projected p.m. peak-hour traffic volumes are shown in Table 4.1-A. The number of lanes is based on a capacity of 2,000 vehicles per lane and the total p.m. peak-hour volume for both directions on the freeway. Because of these assumptions, the number of lanes needed to accommodate the projected traffic volumes are the minimum number needed. To accommodate the traffic at an adequate level of service, the number of lanes could increase; however, it is doubtful that this number of lanes would be built over the 20-year planning period.

Table 4.1-B **INTERSECTION LEVEL OF SERVICE**

	Existing 1987		Draft General Plan*		Draft General Plan (Mitigated)	
	V/C	LOS	V/C	LOS	V/C	LOS
Lagoon Valley & I-80 W/B			0.33	A		
Lagoon Valley & I-80 E/B			0.65	B		
Cherry Glen & I-80 W/B			0.59	A		
Cherry Glen & I-80 E/B			0.74	C		
Alamo & Merchant	0.93	E	0.52	A		
Alamo & I-80 E/B	0.79	C	0.48	A		
Davis & I-80 W/B (Hickory)	0.67	B	1.00	F	0.72	C
Bella Vista & Davis	0.35	A	0.55	A	0.55	A
Davis & Hume			0.69	B	0.69	B
Depot & Mason	1.00	F	1.17	F	0.96	E
Mason and Peabody	0.84	D	0.83	D	0.72	C
Peabody & Cliffside	0.85	D	1.14	F	0.86	D
Allison & E. Monte Vista			0.77	C	0.77	C
Browns Valley & E. Monte Vista	0.39	A	1.15	F	0.83	D
E. Monte Vista & I-80 W/B	0.39	A	0.91	E		
Harbison & Nut Tree Parkway [New Ramps]			1.10	F	[0.67]	[B]
Nut Tree & E. Monte Vista			0.65	B	0.77	C
Orange & I-505 N/B			0.78	C	0.78	C
Orange & I-80 W/B			0.62	B	0.62	B
Leisure Town & I-80 W/B	0.27	A	1.40	F	0.79	C
Leisure Town & I-80 E/B	0.55	A	1.04	F	0.75	C
Vaca Valley & I-505 N/B	0.20	A	0.63	B		
Vaca Valley & I-505 S/B	0.15	A	0.76	C		
Midway & I-505 N/B			0.38	A		
Midway & I-505 S/B			0.47	A		
Midway & I-80 W/B			0.62	B		
Midway & I-80 E/B			0.72	C		
Meridian & I-80 W/B			0.79	C		
Meridian & I-80 E/B			0.48	A		
Peabody & Alamo	0.60	A	1.06	F	0.86	D
Peabody & Marshall	0.64	B	1.01	F	0.80	C
Peabody & California			0.77	C		
Nut Tree & Elmira	0.54	A	0.84	D	0.75	C
Nut Tree & Marshall	0.49	A	0.79	C	0.64	B
Peabody & Hume			0.97	E	0.97	E
Leisure Town & Orange			1.12	F	0.86	D
Depot & E. Monte Vista	0.85	D	0.92	E	0.92	E
Nut Tree & Orange			0.53	A	0.53	A
Allison & Nut Tree Parkway [New Ramps]			1.02	F	0.72	C
					[0.77]	C

* Assumes Current General Plan Intersection Geometrics.

LOS = Level of Service

V/C = Volume to Capacity

The number also shows the planned future number of lanes for I-80 and I-505. The number of lanes is based on the recommendations in the *National Strategic Transportation Planning Study* for I-80 by the Metropolitan Transportation Commission and Sacramento Area Council of Governments. As can be seen in Table 4.1-A, virtually all the segments of I-80 in Vacaville are projected to be over capacity with completion of the existing City General Plan.

It should be noted that traffic volumes, thus number of lanes, on I-80 could be reduced if all the improvements in the *National Strategic Transportation Planning Study* were implemented.

Similar problems exist at each of the interchanges with and overcrossing of the freeways in the City.

Intersection LOS Analysis. To evaluate the future lane geometrics at critical intersections, a capacity analysis was conducted for 37 intersections. (See Table 4.1-B.) The traffic volumes used in the analysis reflect the existing conditions and General Plan buildout.

The Traffic Study does not analyze each intersection within the Study Area. The intersections analyzed are those by freeways and other impacted intersections. Subsequent to the General Plan adoption, the City will thoroughly update the Citywide Transportation Study.

For the existing conditions, the actual level of service may vary from that shown in Table 4.1-B, but they are shown as a comparison of changes in existing LOS D to projected intersection operations. A LOS C criteria and maximum approach lane configuration of two left-turn lanes, three through lanes, and a right-turn lane were used as guidelines to aid in the design of each intersection. At some intersections there were existing land use constraints that were considered in the intersection design; thus, it was not feasible to obtain LOS C.

The critical movement summation method of capacity analysis was used in this report. This method involves consideration of "critical" (or high volume) conflicting movements and is based on information from a number of sources including *Highway Capacity Manual*, Special Report 209, Transportation Research Board, 1985.

The volume-to-capacity ratio (V/C) is an indication of the level of service (LOS) at which an intersection is operating. The LOS classification system is a scale which ranks street, highway, and intersection operations based on the amount of traffic and traffic operations. A complete description of the system is included in the *Highway Capacity Manual* (Special Report 209) Highway Research Board, 1985. As noted earlier and as shown in Appendix 1, the LOS ranking system is a scale with a range of A through F. Level A represents free flow conditions and level F represents jammed or capacity conditions.

Table 4.1-B shows the projected LOS at all 37 critical study intersections for proposed General Plan buildout conditions as determined by the model. The location of critical intersections and roadways is shown on Figure 4. The recommended lane configurations for these intersections are shown schematically in TJKM's Technical Report. (See Appendix 11.) Buildout volumes were first analyzed using currently approved and adopted intersection geometrics taken from the *Updated Citywide Transportation Study for the City of Vacaville* dated August 15, 1989. Because of increased volumes, some intersections required additional mitigation. Mitigated intersection capacity calculations are shown in Column 3 of Table 4.1-B.

Mitigation: Streets and Highways

It is recommended that the necessary right-of-way for the recommended improvements be obtained or reserved. Actual intersection design should be done using detailed field counts and observing actual traffic patterns before implementation. For all arterial-to-arterial intersections and other designated major intersections, the City should adopt a policy that would restrict or eliminate driveway access within 60 feet of the intersection on all arterial approaches. This policy would increase the capacity of the intersection. In addition, Plan Policy 2.3-I11, calling for Special Study Areas to resolve circulation problems, will allow approximate mitigation to be defined. (See discussion in TJKM report in Appendix 11, pp. 21-22.)

Interchanges. As part of the intersection analysis, an evaluation of each of the nine major freeway interchanges and two overcrossings was completed.

Recommendations regarding the number of freeway ramp lanes and overcrossing lane needs are included in this section. For all the interchange ramp areas it is recommended that access to the ramps from abutting land uses be eliminated or reduced.



NOTE:
Critical intersections and roadways are without addjtional mitigation

Vacaville - Location of Critical Intersections and Roadways

Figure 4

Prepared by: TJKM

Alamo Drive and I-80. The improvements planned for this interchange should be adequate for the overcrossing and eastbound ramps. The westbound off-ramp from I-80 on Merchant Street can remain as it currently exists.

Davis Street and I-80. The eastbound ramps could remain as they exist. The westbound ramps could remain as one-lane ramps. However, Hickory Lane should be widened to five lanes with appropriate transitions to the one-lane freeway ramps. The Davis Street undercrossing should be widened to accommodate four lanes. This intersection and interchange is being studied in more detail. This and further analysis will be necessary to identify the ultimate lane configurations.

Mason Street-Elmira Road/I-80. Major improvements are recommended for this interchange. To accommodate the projected traffic flows, the westbound and eastbound on-ramps and westbound off-ramp should be widened to two-lane ramps. To do this, the I-80 freeway bridge over Mason Street would need to be widened. The eastbound off-ramp can remain as a one-lane ramp. To accommodate the two westbound on-ramp lanes, an auxiliary lane may be needed. This would require widening the bridge structure over Davis Street which would be subject to review and approval by Caltrans. This intersection and interchange is currently being studied in more detail by the City. This and further analysis will identify ultimate lane configurations.

The Mason Street/I-80 undercrossing is projected to need to be widened to six lanes. From discussion with City Public Works staff and field observations, TJKM believes this can be accomplished since the railroad on the north side of Mason Street in this area has been abandoned, and this area can be used to widen the road.

On Cliffside Drive, it is recommended that consolidation of commercial driveways be considered to reduce the number of driveways. This would increase safety and capacity for vehicles coming off or going onto the freeway. Additional right-of-way would be needed to implement the recommended improvements from Cliffside Drive.

Access to Stevenson Street, off of Depot Street, should be eliminated due to conflicts between vehicles entering the freeway and vehicles turning into and out of Stevenson Street.

Monte Vista/I-80 Overcrossing. A nine-lane overcrossing is projected for this facility. It is necessary that it be realigned to provide better access to Allison Drive.

Nut Tree Road/I-80 Overcrossing. As the Northeast Vacaville industrial area grows, it is recommended that the Nut Tree Road/I-80 overcrossing be widened to a four-lane divided facility. This would necessitate redesign of the existing Nut Tree Road/East Monte Vista Avenue intersection.

Leisure Town Road/I-80 Interchange. The major planned industrial area to the north and west of this interchange, including all of the Chevron Industrial Park, will significantly impact this interchange. To accommodate the projected traffic volumes, the interchange would need to be reconstructed with new ramps added, realignment of existing ramps, and widening of the overcrossing.

The major ramp improvements would include realignment of the westbound on- and off-ramps to line up with Vaca Valley Parkway, widening of the Leisure Town Road/I-80 overcrossing to eight lanes (five southbound and three northbound), and the installation of a new eastbound on-ramp.

Vaca Valley Parkway/I-505 Interchange. The major recommendations for this interchange are widening of the Vaca Valley Parkway overcrossing of I-505 to eight lanes (six through lanes and two right-turn lanes and a median), widening of the northbound off-ramp at Vaca Valley Parkway to three lanes (two left- and one right-turn lane), widening of the southbound off-ramp to two lanes at Vaca Valley Parkway (one left- and one right-turn lane), construction of eastbound Vaca Valley Parkway to northbound I-505 on-ramp loops, and slight reconstruction of the existing northbound and southbound on-ramps as right-turn-only ramps.

Peña Adobe/Cherry Glen Road and I-80. The Peña Adobe/Cherry Glen Road overcrossing is projected to be four lanes. The westbound on and off ramps could remain as they exist, but some improvement would be required to realign the overcrossing with major intersections proposed in the Lower Lagoon Valley.

Cherry Glen Road/Lower Lagoon Valley Road and I-80. As the Lower Lagoon Valley area is developed, it is recommended that the Cherry Glen Road/I-80 overcrossing be widened to four lanes. The interchange should be redesigned as a partial cloverleaf with eastbound and westbound loop on-ramps, or, as discussed, a combination of the two designs.

AIRPORTS

Setting: Airports

The Nut Tree Airport is a Solano County owned and operated general aviation facility located in the triangle between Browns Valley Parkway and East Monte Vista Avenue. As a general aviation airport, it serves businesses and individuals, but does not provide scheduled passenger service. As of 1989, the airport handled 300 operations per week for an annual total of 15,600. Planes ranged in type from biplanes to two-engine corporate jets.[1] The General Plan Diagram shows the airport environs land use compatibility zones for the Nut Tree Airport. Restrictions on development in each of these zones are prescribed in the Zoning Ordinance.

In December 1988, the airport purchased land for a 900-foot runway extension which, when completed in 1991, will not only accommodate more general aviation flying but also will make possible scheduled commercial flights. Two regional commercial carriers, Sky West and American Eagle, have expressed some interest in using the airport, but no definite plans have been made nor levels of use projected, and commercial flying is at least three to five years in the future, if at all. The airport is revising its master plan and expects a draft to be completed by Fall.

The Nut Tree Airport Land Use Compatibility Plan, adopted by the Airport Land Use Commission in 1988, establishes criteria for evaluating land use proposals in the vicinity of the airport. These criteria have been incorporated in the City's zoning regulations by adoption of an airport compatibility overlay district which sets height and land use limitations and prescribes review procedures.

A 1980 joint report of the Metropolitan Transportation Commission and ABAG, *The Regional Airport Plan: General Aviation Airports Final Report*, listed the Nut Tree Airport's capacity as 250,000 operations per year (Table III-1), and stated that its long-term use should be to serve general aviation needs (p. 55). While the report mentioned the possibility of commercial flight, a later addendum to the report recommended that the Nut Tree Airport remain a general aviation airport permanently.

The Lagoon Valley gliderport operations have an impact on development of adjacent lands, and a similar land use compatibility map has been adopted. (See the General Plan Diagram.)

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[1]Telephone communication, John Swizer, Airport Manager, December 28, 1988.

The Travis Air Force Base Comprehensive Airport Land Use Plan (ALUP), adopted by the Solano County Airport Land Use Commission in January, 1990, establishes criteria and standards for development potentially affected by aircraft operations at the base. All areas proposed for development under the Draft General Plan are well outside the critical 60 CNEL noise contour. However, the Travis ALUP will have an effect on development in Vacaville through the proposed structure height limitations and requirement for filing of avigation easements.

Impacts: Airports

The proposed General Plan will allow for development within the Nut Tree Airport environs and the Travis ALUP referral zone boundary, but specific land uses have been selected to be compatible with the Airport Land Use Commission's policies and standards. Further, the Plan calls for continuing review of development proposals within the Travis and Nut Tree referral zones, so appropriate standards and conditions of approval may be imposed. The mechanism for this is the City of Vacaville's Nut Tree Airport Land Use Compatibility Overlay District established in the Zoning Ordinance. The General Plan also requires the establishment of a Travis Airport Land Use Compatibility District in the Zoning Ordinance.

The proposed General Plan also would allow redevelopment of the Vacaville Gliderport, which will displace this use. Whether the gliderport operator will be able to relocate to another site offering comparable soaring opportunities is unknown at this time.

Mitigation: Airports

Plan policies and existing regulations provide adequate mitigation consistent with the Travis and Nut Tree Airport Land Use Plans and no additional mitigation is required.

4.2 AIR QUALITY

Setting: Air Quality

The California Air Resources Board (CARB) has established 13 regional air basins representing areas of similar meteorological conditions to monitor and control air quality. Vacaville is a part of the Sacramento Valley Air Basin, and shares the "airshed" with cities which belong to Sacramento, Yolo, Colusa, Sutter, Yuba, Glenn, Butte, Tehama, Shasta and parts of Solano and Placer counties. Several cities and counties, including Vacaville and the north and east parts of Solano County, have been assigned to the Sacramento Air Quality Maintenance Area (AQMA) for air quality planning purposes.

Various Air Pollution Control Districts (APCDS) within the AQMA operate nineteen monitoring stations, which measure levels of ozone (0_3), nitrogen oxides (NO_X), carbon monoxide (CO), and total suspended particulates (TSP). APCDs have the primary responsibility for preparation, adoption, implementation, and enforcement of mobile, stationary, and area emission control measures. Vacaville lies within the Yolo-Solano Air Pollution Control District which operates the air quality monitoring station on Merchant Street. (See Table 4.2-A)

The Sacramento Air Basin has a serious air quality problem, and the AQMA violates the National Ambient Air Quality Standard for ozone about 10 days per year, and the stricter California standard about 35 times per year.[1] The entire Sacramento AQMA has been designated a non-attainment area for ozone. However, the station at Vacaville recorded no exceedances of the federal ozone standard between 1984 and 1988, and an annual average of only three exceedances of the stricter California standard during the same period. This recent record of ozone exceedances is the best record of any monitoring station under the Yolo-Solano APCD's jurisdiction.

The Yolo-Solano APCD also monitors CO by means of an econolyser (electrolyte cell), a method that is not certified; however, the instrument is audited for reliability by the District and by the California Air Resources Board. In 1988, the maximum one-hour CO level recorded was 4 parts per million, well below the State's one-hour standard of 20 ppm. The Yolo-Solano APCD has monitored nitrogen dioxide and sulfur dioxide (SO_2) levels in the past, but because recorded levels were substantially below standards, these

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[1]Sacramento Area Council of Governments, *Regional Air Quality Plan*, 1990.

pollutants are no longer monitored.[2] The Yolo-Solano APCD is designated as an unclassified area for all pollutants but ozone, indicating that attainment of standards has been achieved for CO, TSP, NO_2, and SO_2.

The Sacramento Valley Air Basin is characterized by a semi-arid temperate climate with warm summer temperatures and light winds. As a basin, it is prone to the accumulation of pollutants. Inversion layers trapped within the basin and capable of limiting vertical mixing of air pollutants with uncontaminated air are typical.

Vacaville's location on the southwestern portion of the Sacramento Valley exposes it to predominantly west-southwesterly winds admitted via the Cordelia Gap and the Carquinez Strait.[3] The influence of moving marine air may contribute to the maintenance of Vacaville's air quality compared to the Sacramento Air Basin as a whole.

The Sacramento Air Quality Maintenance Plan (AQMP) includes a Plan Element and Program formulated by the Yolo-Solano APCD which addresses control measures to attain the federal ozone standard. The AQMP addresses area source controls, transportation control measures, and land-use development controls to reduce air pollutant emissions. Implementing these actions comes under the responsibilities of the local governments in the Yolo-Solano APCD such as Vacaville.

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[2]Mr. Koslow, APCD, Telephone Conversation of 1-18-89.

[3]State of California Air Resources Board, *Climate of the Sacramento Valley Air Basin*, November 1974. As quoted in ESA's *Ulatis Creek Development Area EIR*, January 1990.

TABLE 4.2-A
VACAVILLE-MERCHANT STREET STATION
AMBIENT AIR QUALITY MONITORING STUDY IN VACAVILLE
1985-1988
(Days Standards Were Exceeded)

Pollutant	Standard[a]	1985	1986	1987	1988
Ozone	1 hr. ≥ 0.10 ppm (S)(1985-87)	--	0	12	--
	1 hr. > 0.09 ppm (S)(1988)	--	--	--	2
	1 hr. ≥ 0.12 ppm (N)	0	0	0	0
	Max. 1-hr. Conc. (ppm)	0.07	0.09	0.12	0.10
Total Suspended Particulates	24 hrs. ≥ 100 ug/m3 (S)	2	3	1	1
	24 hrs. ≥ 150 ug/m3 (N)	0	1	0	0
	24 hrs. ≥ 260 ug/m3 (N)	0	0	0	0
	Max. 24-hr. Conc. (ug/m3)	97	82	107	130
	Number of Samples	61	61	61	44

Notes: [a](S) State Standard; (N) National Standard; ppm, parts per million; ug/m3, parts per cubic meter

Source: California Air Resources Board, 1985-88. Annual summaries of Air Quality Data; and Yolo-Solano Air Pollution Control District.

Impacts: Air Quality

With increased urbanization such as is proposed by the Draft General Plan, emissions of air pollutants in Vacaville would increase. Existing (1987) vehicle miles traveled is 2,258,340, whereas the proposed Plan vehicle miles traveled would be 7,911,373, an increase of 350 percent. As shown in Table 4.2-B and modeled by URBEMIS2, at buildout in 2010, total organic gases (TOG) will increase by 280 percent, carbon monoxide (CO) will more than triple, and nitrogen oxides (NO_X) will increase by 375 percent. Projecting existing conditions to 2010 results in a positive change in air quality, as

auto emissions are expected to improve. Assuming a progressively cleaner "fleet," proposed Plan comparisons show TOG increasing by 480 percent, CO increasing by 420 percent, and NO_X increasing by nearly 460 percent. Model runs were also completed for the existing General Plan and for the Sketch Plan Alternatives. Results are reported in Section 5.2. (See Appendix 2 for detailed calculations.)

TABLE 4.2-B
ESTIMATED EMISSIONS FOR PROPOSED PLAN AT 2010 vs. EXISTING CONDITIONS AND EXISTING CONDITIONS PROJECTED TO 2010
(Tons per Day)

	TOG	CO	NO_X
Existing Conditions	3.6	30.5	4.4
Existing Conditions Projected to 2010[a]	2.1	22.1	3.6
Proposed Plan Projected to 2010, Buildout	110.1	97.6	16.5

Notes: TOG = Total Organic Gases; CO = Carbon Monoxide; NO_X = Nitrogen Oxides

[a]Figures in the second row are smaller than the first row, since the model assumes a progressively cleaner fleet.

Model: URBEMIS2, a land-use-based emissions model, supplied by the California Air Resources Board.

Ozone (0_3) is not emitted directly into the atmosphere, but is a secondary pollutant produced through photochemical reactions involving Hydrocarbons (HC), NO_X, and sunlight. Ozone generation is recognized as a regional problem, and regional solutions are required; numerous small sources of HC and NO_X are spread throughout the Sacramento Valley Air Basin, and large quantities of O_3 precursors are believed to be transported from metropolitan areas and dispersed throughout the region. In the sense that the proposed Plan will increase Vacaville's HC and NO_X emissions, it will contribute to the regional ozone problem.

Increased pollutant levels may cause health impacts, affecting both healthy members of the population and "sensitive receptors." Sensitive receptors include land uses such as schools, hospitals, and convalescent homes, because their occupants -- the young, the infirm, and the elderly -- are more susceptible to respiratory infections and other air-quality-related health problems than members of the general public. Residential areas are also considered sensitive receptor land uses, since occupants who work at home are exposed to any pollutants which might be present for extended daytime periods. All of these land uses are projected to increase under the proposed Plan. Agricultural areas, also sensitive to air pollutants, are expected to decrease.

New construction is expected to result in air pollutant emissions from "fugitive dust," particulate matter which may be generated through land clearing, excavation, and grading activities, or initiated by truck movement.

Mitigation: Air Quality

Plan policies provide substantial mitigation. Transportation Systems Management (TSM) measures are proposed for implementation under the Plan. (See Plan policies in section 6.4, Transportation Systems Management.) These measures are intended to reduce vehicular traffic, and reduce air pollution attributable to vehicular traffic. Measures particularly applicable to Vacaville include advertising and promoting active TSM programs, preferential parking for car and van pools, and encouraging alternative modes of transportation, including bicycle trails (and bike racks at public and commercial locations) and pedestrian amenities, including paths and accessible open space.

Plan policies in the Air Quality Section and the Transportation Element call for TSM measures that would reduce peak-hour trip generation of larger employers, improve local bus services for residents, and promote bicycle

use. (See Plan Policies 6.4-G1 through 6.4-I11, and 8.3-I2.) If ongoing air quality monitoring at the Merchant Street Station shows unsatisfactory levels of pollutants, it may be appropriate to implement more ambitious TSM measures than are included in the proposed Plan. Further improvements in air quality may be achieved by considering and possibly adopting other land use and transportation control measures suggested in the Sacramento Air Quality Maintenance Plan, i.e., parking restrictions and pricing, etc.

In addition, where buildout of large projects will result in violation of traffic standards unless a TSM program with a 30 percent peak-hour reduction is highly successful, the project should be phased and travel behavior carefully monitored. Only if the TSM objective is actually achieved should development beyond the first phase be permitted at the originally envisioned density. Approval of subsequent phases should be dependent on demonstration of success in both reaching TSM objectives and attaining traffic standards. This approach, phasing and monitoring, is proposed as an additional mitigation to reduce the risk of overstating the potential of TSM measures to mitigate the impacts of high traffic generating uses on the City's circulation system.

4.3 NOISE

Setting: Noise

The major sources of noise in Vacaville are Interstate 80 and arterial traffic, the Nut Tree Airport, and the railroads. Industrial facilities were evaluated with respect to noise by Charles Salter and Associates, acoustical consultants, and were estimated to produce a negligible contribution to the noise environment. Future noise contours, illustrated in Figure 10-1 of the General Plan, show where homes would be subject to day/night average noise levels exceeding 60 decibels (dB) which is considered "normally acceptable" except where protected by a sound wall or other barriers, and 70 db, which is where noise levels are normally unacceptable and new residential development should be discouraged.

Some existing and proposed schools will also be subject to noise levels exceeding 60 dB, which is considered "normally acceptable" for schools as well as residential areas.

Impacts: Noise

As noted in the Plan, I-80 will continue to be the major noise source in Vacaville, creating noise in the closest residential areas up to 15 db above the normally acceptable standard by 2010. Noise levels along major

arterials that exceed the normally acceptable standard for unshielded residential development of 60 dB also are projected to increase by 2010.

The residential areas that would be impacted by noise levels exceeding the "conditionally acceptable" limit of 70 dB include a small section of the proposed golf course residential community north of Cherry Glen Road (as relocated), an existing residential neighborhood between Merchant Street and the freeway, an existing residential neighborhood south of the freeway between Alamo Drive and Peabody Road, and a residential neighborhood north of Elmira Road and south of the freeway.

Mitigation: Noise

Plan policies and standards for noise exposure should provide adequate protection for future residential development by requiring noise barriers as a condition of development approval. Caltrans should be encouraged to construct noise barriers to protect existing residential neighborhoods impacted by freeway noise.

4.4 VISUAL QUALITY/COMMUNITY IMAGE AND FORM

Setting: Visual Quality/Community Image and Form

Definition of terms: Image, Form and Visual Quality. The "image" of a city is a term developed to describe the way residents perceive the overall urban environment in which they live. The perception of city image is, therefore, a response to urban "form." The ability to form an image of place is an important component of daily life and well-being. Communities with a strong urban form defined by landmarks, urban limit lines and physical separation from neighboring cities are deemed to offer a higher quality of life than cities that sprawl seamlessly into one another.

"Visual quality" is a term used somewhat interchangeably with "image." Generally, most people create their dominant formal image of a community by what they see. Much of the attention paid to visual quality is focused on "the view from the road"; in other words, how people driving on the freeways create an image of Vacaville in their minds. Do they know where the City begins and ends? Can they distinguish Vacaville from Fairfield? Is the visual experience pleasant and interesting enough to encourage drivers to leave the freeways and visit the City's shops, parks, and stores? The concern, therefore, with the visual quality impacts of the General Plan on Vacaville's environment is addressed by the following question: How will the land use decisions proposed in the General Plan affect the ability of residents and

visitors to form a clear and useful image of the City?

Relationship between Community Image and Community Design. A component of community image is community design. Whereas community image looks at how the city is perceived on a citywide (macro) scale, community design concerns itself with street-, neighborhood-, or project-specific (micro) qualities. Put succinctly, community image provides the framework for community design. A community that concerns itself solely with questions of community design without looking at its overall urban form will only partially satisfy the needs of residents for a clear and useful image of their city. The General Plan addresses community image and community form principally in the Land Use Element, Section 2.1.

Vacaville's Urban Form. Vacaville's urban form is determined by its natural setting and large man-made features of the environment. In 1990, the City maintained a clear urban edge on its southern, eastern and western sides. The northern planning sectors of the City presented less clarity due to the mix of residential and industrial land uses, the presence of large rural residential areas in Solano County adjacent to the City limits, and the absence of natural features in the landscape (hills, creeks, etc.) to form easily-identifiable boundaries. Significant man-made features of the environment include the two freeways, the Basic Plant, the Downtown, highway commercial uses (Nut Tree, Wooz, Factory Outlet Stores), and the Putah South Canal.

Impacts: Visual Quality/Community Image and Form

The most significant impacts will occur in the West Valleys (Lower Lagoon Valley, Upper Lagoon Valley), and the North and Northeast Planning Sectors. The residential, commercial and business park land uses proposed on both sides of Interstate 80 in the West Valleys will reduce Vacaville's visual distinction from Fairfield at Vacaville's southern gateway. (The City of Fairfield has proposed development immediately to the south of the Lower Lagoon Valley in its Paradise Valley area. At an average speed of 55 mph, it will take less than five minutes to travel on I-80 between the two areas.) In the North and Northeast Planning Sectors, development is proposed up to the Solano County line at Cantelow and Midway roads, removing any separateness here between the City and urbanized County areas.

In the East, Southeast and South Planning Sectors, General Plan policy calls for maintaining an urban edge through a 500' transition zone, which would be a buffer between new residential and existing agricultural uses. A community separator is proposed east of the Cement Hills between Vacaville and Fairfield.

Mitigation: Visual Quality/Community Image and Form

The General Plan proposes policies to mitigate impacts to the visual quality of the City in the Land Use and Open Space elements. The chief components are:

Policy Plans: These are required for all new development areas to ensure that City design and infrastructure requirements are met. As part of the preparation of new policy plans, visual analysis using environmental simulation techniques (photography, video, photomontage) to demonstrate the visual impacts of proposed projects could be used.

Downtown: The General Plan calls for strengthening the City's Downtown by designating it as a Policy Plan Area. As part of the Downtown area, the Basic Plant site will be redeveloped. Policy Plan guidelines call for designs that ensure that this site remain an important landmark for the City.

Transition Zone near Leisure Town Road: To maintain an urban limit line on the City's east side, the General Plan proposes a 1500' transition zone east of Leisure Town Road.

Community separator between Vacaville and Fairfield: The proposed one-mile wide separator would run east of the Cement Hills in a mile-wide band to Highway 113.

Community separator between Vacaville and Dixon: Plan policies call for establishing a separator two miles wide between the two communities along the I-80 corridor.

West Valleys: These areas are designated as Policy Plan Areas (see above). Requirements that visual analysis of all proposed projects be performed as part of environmental review (i.e., EIR preparation) may aid in developing solutions that are more compatible with the rural setting of the area. Visual impacts to this area are judged to be significant, but they can be partially mitigated by the policy plans.

Hillsides (over 25% slope line) and Ridges: No development is to occur on steep slopes and resource protection and hillside development standards are to be adopted. No further mitigation is required.

4.5 COMMUNITY SERVICES

SCHOOLS

Setting: Schools

Districts: Boundaries. The City of Vacaville is served by three school districts: Vacaville Unified School District (VUSD), Travis Unified School District (TUSD), and Dixon Unified School District (DUSD). Although the majority of the City's school children attend Vacaville Unified schools, rapid residential growth in the South Planning Sector has increased the percentage of school-age children served by Travis Unified. The Dixon Unified School District boundary includes the far northeast corner of Vacaville and serves school children living in this sparsely populated rural section.

In addition to these three districts, a small area of unincorporated land in the Lower Lagoon Valley falls within the jurisdiction of the Fairfield-Suisun Unified School District (FSUSD). Under the General Plan, this area is proposed for residential land use in the form of a golf course residential development. If residential development occurs here, parents will need to send their children outside the Lower Lagoon Valley to schools within the Fairfield-Suisun district. The General Plan does not call for the development of a new school in the Lower Lagoon Valley.

General Plan Figure 5-1 illustrates the current boundaries of the four school districts serving the City of Vacaville and adjacent areas of Solano County that are proposed for annexation as part of the General Plan.

Existing Schools: Permanent and Operating Capacity. Two variables, permanent capacity and operating capacity, are used to assess a school district's ability to provide classroom space for current and future students. Permanent capacity is a measure of a district's built classroom space. In February 1990, the Vacaville Unified School District operated ten elementary schools (K-5,6) with 3,915 permanent seats, two junior high schools (7-8) with 1,488 permanent seats, and two standard senior high schools (9-12) with 3,323 permanent seats. One of these high schools, Will C. Wood, currently has grades 8-10 and will complete transition to a full four-year high school by the fall of 1991. One continuation high school, Country High, was also in operation, providing 126 classroom seats. Three new elementary schools (1,836 seats) were scheduled to be opened: Jean Callison, September 1990, and Browns Valley and Cooper Schools, September 1991.

Within the Travis Unified School District, one elementary school, Cambridge, provided Vacaville school children with 448 permanent seats, and a new elementary school (750 permanent seats) was planned. A new middle school (7-8) within the Foxboro subdivision (750 permanent seats) was also scheduled to serve the area. High school students attended schools outside the incorporated City limits. Within the DUSD boundaries, an estimated 50 to 55 students from Vacaville, including 22 elementary school students, attended Dixon schools, and no district schools were located within Vacaville's incorporated City limits.[4] In like manner, 18 Vacaville school children (K-8) were reported attending FSUSD schools,[5] and no school buildings were located within the City. Table 4.5-A provides an inventory of all schools within the three main districts serving the City of Vacaville. Table 4.5-A also shows permanent capacity of schools within the Planning Area by district and school type.

The operating capacity of a school is established by counting the number of seats provided by portable classrooms and adding these to the school's permanent capacity. In 1990, all Vacaville school children within the Vacaville or Travis districts attended schools in which portable classrooms were used to provide classroom space. Portable classrooms are considered a solution to problems of over-enrollment and overcrowding by school administrators. In Vacaville's schools, the use of portable classrooms is necessitated by the high rate of new housing construction in the City. Some schools, such as Elmira, Markham and Vacaville High School, seat more than half of their students in portables.

Future Enrollment. The methodology used to project future enrollment employs three variables: student yield rate, sum total of housing units, and percent of private school enrollment. The three school districts serving Vacaville have traditionally used student yield rates (SYR) in the .70 range. A SYR of .70 was used to project future student enrollment by school type as follows: Elementary (K-6) = .4 students/dwelling unit, Junior or Middle School (7-8) = .1 students/dwelling unit, and Senior High School (9-12) = .2 students/dwelling unit.

A certain percentage of all school-age children is expected to be enrolled in private schools. Based upon 1990 K-8 enrollment as reported to the

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[4]Phone conversation with Gerry Laird, Superintendent of Dixon Schools, April 1990.

[5]City of Vacaville; California Department of Finance Form 106: City Resident K-8 Enrollment, 1/1/90.

California Department of Finance, this percentage is approximately 5.7. These students were not counted within the total of projected future student enrollment.

TABLE 4.5-A
SCHOOL CAPACITIES AND ENROLLMENT, FEBRUARY 1990

School	Grade	Operating Capacity[a]	Enrollment	Permanent Capacity
Vacaville Unified School District				
Alamo(4)[b]	K-6	619	641	522
Elm(7)	K-6	511	511	348
Elmira(29)	K-5	913	913	116
Fairmont(3)	K-5	726	726	638
Hemlock(4)	K-6	539	539	493
Markham(21)	K-6	901	901	464
Orchard(1)	K-6	329	342	261
Padan(14)	K-6	968	968	522
Sierra Vista(14)	K-5	753	753	290
Ulatis(1)	K-6	242	241	261
Vaca Peña(10)	7-8	819	819	458
Willis Jepson(4)	7-8	1,041	1,086	1,030
Will C. Wood(3)	9-12	1,809	1,283	1,800
Vacaville High(16)	9-12	2,142	1,674	1,523
Country High(5)	9-12	126	153	126
Browns Valley	K-6	600	0	612
Jean Callison	K-6	600	0	612
Cooper	K-6	600	0	612
Subtotal	**K-12**	**14,238**	**11,550**	**10,688**
Travis Unified School District				
Cambridge(4)	K-5	560	453	448
Center	K-5	854	522	854
Scandia	K-5	635	468	635
Travis	K-5	983	422	983
Golden West	6-8	1,236	656	1,236
Foxboro Elementary	K-6	750	---	750
Vanden	9-12	1,011	680	1,101
North Campus	9-12	26	40	26
Foxboro East	K-6	750	0	750
Subtotal	**K-12**	**6,805**	**3,241**	**6,693**
Dixon Unified School District				
Silveyville	K-2	733	733	733
Anderson	3-5	668	668	668
C.A. Jacobs	6-8	610	610	610
Dixon High	9-12	714	714	714
Continuation	9-12	56	56	56
Subtotal	**K-12**	**2,781**	**2,781**	**2,781**
TOTAL		**23,824**	**17,572**	**20,162**

Notes: [a]Includes students in portables or other temporary facilities.
[b]Indicates number of portables in use.

Table 4.5-B presents the projected public school enrollment by school type and school district using the variables described above.

TABLE 4.5-B
PROJECTED STUDENTS UNDER GENERAL PLAN BUILDOUT, 2010

District	K-6	7-8	9-12	Total
Vacaville	12,610	3,150	6,300	22,060
Travis	2,450	610	1,230	4,290
Fairfield-Suisun	215	55	110	380
Total	15,275	3,815	7,640	26,730

Impacts: Future School Need

The common use of portable classrooms in Vacaville schools is an indicator of an imbalance in the relationship between construction of new homes and new school facilities. The trend in the City has been for new families and their school-age children to settle in Vacaville faster than the school districts can build new facilities. The General Plan will accommodate continued residential growth in the City, indicating a strong need for new school construction. Using operating capacity as a basis for determining this need endorses the continued use of portables as classrooms for Vacaville's students but reduces the projected number of new schools needed. In discussing this difference, school administrators stated that they consider the use of portables to be a temporary solution to crowding problems and would prefer that new school need be based upon permanent, not operating, capacity. At the same time, most recognize that portable classrooms are a necessary tool used to accommodate students in their rapidly growing cities and one they will continue to employ in the future. In California, the State Department of Education requires that school districts maintain at least 30 percent of their total capacity in portable classrooms in order to respond to wide fluctuations in school enrollment.

Mitigation: Enrollment and Future School Need

The principal way in which implementation of the General Plan will affect the school districts is seen in the increased need for new schools. A secondary impact will be the effect of growth in the student population on existing school facilities, specifically physical facilities and educational programs.

Four mitigation measures are proposed as City policy to address these impacts. First, the General Plan proposes a total of thirteen new schools. (This future school need is based upon 1990 operating capacity, not permanent capacity.) When new school need is projected based upon average school sizes (K-6 = 600 students, 7-8 = 1000 students, 9-12 = 2000 students), however, the number of schools provided by the General Plan meets the projected need exactly.

Second, the proposed Plan requires policy plans for new residential areas to be annexed to the City to prescribe financing mechanisms for new infrastructure and required public facilities. (See Plan Policies 2.2-I7 and 2.2-I8) This policy applies to new school buildings. A problem identified by parents at public meetings on preparation of the General Plan was that neighborhood facilities such as schools and parks were often not completed within the time frame set by either the City or the developers. City policy can require that these facilities be constructed as a condition of residential construction. Most parents expect to move into new neighborhoods in which schools are ready to enroll their children in school buildings, not in portable classrooms.

Third, City policy calls for the phasing out of portable classrooms. In order to do this, the school districts need to seek funding to improve and expand existing school buildings.

Fourth, the City and the school districts will prepare a joint City/School District Master Plan which will provide greater detail and coordination of school district plans within the City of Vacaville.

Impacts: Siting

The General Plan calls for residential development both within the 1990 incorporated boundaries and on unincorporated Solano County lands proposed for annexation. One of the precepts of good city planning practice is to locate

new schools in relationship to new residential development. In order to do so, the siting of new schools takes several spatial variables into account: the proposed location of new residential growth, travel distance to and from schools, and the location of other public facilities, especially neighborhood parks. Other land use variables considered are: constraints on development (airport safety zones, traffic congestion) which prevent new school siting, or the presence of natural or man-made resources (creeks, parks, buffer areas) which can enhance the new school's setting.

All school sites proposed as part of the General Plan are considered preliminary selections. In the case of the proposed junior and senior high school sites, several alternatives to the proposed sites also are presented. (See General Plan Figure 5-1.)

Impacts: Neighborhood Life

In Vacaville, all ten new elementary schools are proposed as school/park combinations and all are located within or adjacent to areas of proposed new residential growth. These schools can exert a positive impact on the residential areas in which they are located by serving as focal points for neighborhood life. Especially for children, schools and the buildings in which they are housed are a central component of their image of the community and, by extension, of the world in which they live. A positive impact on the quality of life in Vacaville can be achieved through thoughtful and innovative school campus design. It is anticipated that all new park/school centers will have neighborhood centers that accommodate after-school children's programs.

Mitigation: Siting and Neighborhood Life

The combination of school sites with new park sites is considered to be an efficient and economical means of providing for two public facilities (schools and parks) at one site. The alternative to this combined approach is to separate the two public facilities at different sites within residential neighborhoods. From a community design perspective, this alternative is preferred because it introduces more diversity into the physical environment of a standard subdivision. When both facilities are combined, the neighborhood loses the opportunity to provide residents with different destinations within their neighborhood. Again, children are probably more acutely aware of these environmental qualities than adults because they spend more time exploring their neighborhoods, attend neighborhood-based schools, and play in neighborhood parks. Neighborhoods with a greater range of destinations may provide children with a richer experience of their environment.

As a partial mitigation measure, the City should make every effort to work with the school districts, as part of the City/School District Master Plan, to design new school campuses that are architecturally distinctive and take site-specific natural characteristics into account. In addition, it is recommended that school sites be located with access by school children considered as an important siting and design criterion. For example, school sites can be designed and located along proposed multipurpose paths to encourage children to bicycle or walk to school as much as possible.

Impacts: Boundaries

In 1990, three school districts served the incorporated City of Vacaville. Within the City's Planning Area, a fourth district, Fairfield-Suisun USD, also has jurisdiction. The division of the City into so many school districts has occurred as a result of suburban expansion. At the time Vacaville was a small farming community surrounded by agricultural lands, the residents of the incorporated City were served by one school district (VUSD). School district boundaries in Solano County were drawn to bring children from rural areas into schools located in the towns. These district boundaries were distinct and mirrored the separation of communities from one another in Solano County. Suburban expansion has changed the character of Solano County cities and obscured the clear relationship between school district boundaries and the communities they serve.

The EIR recognizes the following boundary impacts:

- **Vacaville Unified School District/Dixon Unified School District boundary:** The Draft General Plan does not propose new residential growth within the northeast corner of the City falling within the jurisdiction of the DUSD. However, any amendment to the General Plan that permitted residential development in this area would generate new students for DUSD schools.

- **Vacaville Unified School District/Travis Unified School District boundary:** Two small parcels south of Alamo Drive and east of Peabody Road remain within the jurisdiction of the Vacaville Unified School District. Alamo Drive is designated as a major arterial in the Transportation Element. Although the General Plan does not call for additional residential development on these parcels, a Residential Medium Density site exists near the intersection of Alamo Drive and Leisure Town Road. School children from this area live within the Vacaville Unified School District and must cross Alamo Drive to get to school.

- **Vacaville Unified School District/Fairfield-Suisun Unified School District boundary:** Residential development proposed by the General Plan for a portion of the Lower Lagoon Valley lying within the jurisdiction of the Fairfield-Suisun Unified School District would generate about 380 students. The General Plan does not designate any new school sites in the Lower Lagoon Valley; consequently, future student residents living within the FSUSD would need to travel outside the area to attend district schools.

Mitigation: Boundaries

- **Vacaville Unified School District/Dixon Unified School District boundary:** No mitigation measures needed as part of the General Plan.

- **Vacaville Unified School District/Travis Unified School District boundary:** As shown on General Plan Figure 5-1, the two parcels south of Alamo Drive that remain within the Vacaville Unified School District are proposed for transfer from that district to the Travis Unified School District in the interest of ensuring the safe travel of children to school.

- **Vacaville Unified School District/Fairfield-Suisun Unified School District boundary:** The area of the Lower Lagoon Valley lying within the jurisdiction of the Fairfield-Suisun Unified School District is proposed for transfer from that district to the Vacaville Unified School District in the interest of achieving a closer correspondence between the City of Vacaville Planning Area boundary and school district boundaries.

Impacts: School Trips

Travel to and from school represents an environmental impact upon the capacity of the City's circulation system, particularly its roads. It is expected that a certain number of school children will bicycle to school each day. Many will be bussed, some will be driven, and some will walk. At the high school level, students in the older grades may already drive their own vehicles to school. Most teachers, administrators and staff are expected to drive to school sites.

Mitigation: School Trips

Children who are not bussed or driven to school by parents need to be ensured of a safe trip along the City's streets. As a result, no new elementary schools have been sited along an arterial street and are located instead within residential neighborhoods.

The traffic analysis prepared as part of the General Plan has taken trips generated by new schools into account.

PARKS AND RECREATION

Setting: Parks and Recreation

The City of Vacaville's 1989 inventory of parks includes five classifications. The first three, neighborhood, community and school parks, are developed open space areas providing a range of recreational facilities. The fourth classification, urban open space, refers to open space areas that are owned by the City and intended to be left in a natural or less-intensive developed state. A fifth category, "Other," is used to described specialized recreation facilities.

In 1989, the Vacaville Parks and Recreation Department changed its name to the Vacaville Community Services Department to reflect a redefinition of its mission. In response to growing demands and changes in its services, the Community Services Department moved to expand into the City's neighborhoods by opening neighborhood-based recreation centers. The Department is responsible for the operation, maintenance, development and acquisition of all City parks and recreation facilities.

Neighborhood parks. Developed primarily to serve the open space recreation needs of a small area of the City, generally within a one-half mile radius of the park. Park improvements and facilities are usually oriented towards the needs of children. The average size of existing neighborhood parks in 1990 falls between 2 and 10 acres. Neighborhood parks are differentiated from community parks on the basis of size, type of facilities provided, and function.

School parks. School parks function similarly to neighborhood parks with the distinction that they are generally smaller in size and are built separate but adjacent to school sites. In 1990, the City counted six school parks ranging in size from 2.5 acres (Alamo School Park) to 8 acres (Sierra Vista School Park). In new subdivision areas, the function of neighborhood and school parks has been combined. The General Plan continues this practice for proposed areas of residential development and proposes changing this classification to Neighborhood School Park. School parks such as Alamo and Fairmont are fenced and available only for limited recreational activities. It is anticipated that all new park/school centers will have neighborhood centers that accommodate after-school children's programs.

Community parks. Community parks are large recreational open space areas intended to serve a portion of the City's population living within a 1 to 1.5 mile service radius of the park site. Community parks provide specialized facilities such as lighted ball fields, swimming pools, and areas and buildings

for community festivals and civic events as well as for organized sports and athletic competitions. While community parks serve larger areas of the City than do neighborhood parks, a community park can also serve as a neighborhood park for the area in which it is located.

Urban open space. Parcels of open space land owned by the City of Vacaville and intended for maintenance in a natural or less-intensive developed state. Many of these lands are steep, and cannot be developed for residential, commercial or industrial uses. Some, such as Old Rocky and Boulder Valley, contain unique geologic features, such as outcroppings and land formations, which serve as local and community landmarks. In the case of Hidden Valley, there are unique plant communities such as large tree-form manzanita and wildflowers. The Community Services Department also lists developed bike trails within the urban open space classification. In 1990, the City had completed over seven linear miles of bike trails, mostly along sections of Alamo and Ulatis creeks.

Other facilities. The Community Services Department classifies specialized recreation facilities and centers as a fifth category called "Other." In 1990, the Department operated three neighborhood-based centers: the Community Center, the John A. McBride Senior Center, and the Athletic Center (Georgie Duke Sport Center). Other neighborhood-based centers that will serve children will be Trower in the Markham area, Fairmont next to Fairmont School, Cambridge next to Cambridge School, and a potential site at Orchard School.

Table 4.5-C presents an inventory of the existing parks and recreation facilities according to the new parks classification proposed in the General Plan. General Plan Figure 4-1, Existing and Proposed Parks and Recreation Centers, shows the location of these parks and recreation facilities.

Regional Park. One regional park, Lagoon Valley Park, lies within the City limits. The park's operation and development are County responsibilities, but the site is owned by the City of Vacaville. At 303 acres, Lagoon Valley Park is intended to provide residents of Solano County with regional recreational opportunities. The Solano County Park and Recreation Element (June 1983) states that the park will fill high priority recreation needs for swimming and group picnicking, medium priority needs for fishing access, and lower priority needs for boating and general picnicking. The County Plan recognizes Lagoon Valley Park as part of the community separator between Fairfield and Vacaville and states that new commercial proposals, annexation, and General Plan changes be carefully reviewed "to avoid undesirable impacts." In addition to its recreational function, Lagoon Valley Park also serves as a habitat and watering area for fish, migratory and resident birds, and mammals (raccoons,

deer, coyote). Wetlands and riparian corridors border its western, southern, and northern sides.

City Park. The City of Vacaville does not have a city park. City parks are defined by national standards as large urban parks of 100-plus acres which fulfill a number of important open space and civic functions. Unlike regional parks, city parks are intended to serve a population within a 30-minute drive of any area of the City and are often accessible by mass transit, such as buses. Two community parks in Vacaville, Pena Adobe (64 acres) and Andrews Ulatis (14.8 acres), have assumed many of the functions of a city park (such as hosting Fiesta Day, the nion Festival, and other civic events) because of their size, location, and histo ical associations.

TABLE 4.5-C
INVENTORY OF PARKS AND RECREATION CENTERS
1990

Neighborhood Parks	Acreage	Neighborhood School Parks	Acreage
Alamo Creek	9.5	Alamo School[a]	2.5
North Orchard	6.4	Hemlock[a]	3.0
Trower	4.5	Jepson	2.0
Valley Oak	6.0	Boulder Valley	4.4
Fairmont/Beelard	8.3	Ridgeview	7.0
Patwin	10.0	Regency	6.6
Southwood	3.8	Meadowlands	8.0
Willows	2.0	Sierra Vista	8.0
Pheasants County	7.0	[a]Fairmont	4.0
Stonegate	6.0	Irene Larsen[b]	4.0
Dos Calles Padan	6.7	Cambridge	3.4
		Foxboro	6.5
TOTAL	70.2 AC		59.4 AC

Note: [a]Fenced School Multipurpose Grass Areas Available for Limited Recreation.
[b]School multi-purpose field available for limited recreation.

Continued

TABLE 4.5-C -- *Continued*

Community Parks	Acreage	Recreation Centers	Type; Age Groups Served
Andrews/Ulatis	14.8	Community Center	Recreation; all ages
Nelson	16.0	John A. McBride	Recreation; seniors
Keating	20.0	Georgie Duke	Athletics; all ages
Foxboro	18.0	Trower	Recreation, after school programs; primarily K-12
Community Center[C]	12.0		
Peña Adobe	14.0	Cambridge	Neighborhood Center
Browns Street	63.0	Fairmont	Recreation, after school programs; primarily K-12
Total	157.8 AC		

Urban Open Space	Acreage
Peña Adobe	50.0
Alamo Terr	7.0
Bike Trails	7.3
Hidden Valley	14.0
"Old Rocky"	25.0
Glen Eagle	250.0
Boulder Valley	7.0
Creekside Bike Rest	.5
North Orchard Bike Rest	.5
Wellsite Bike Rest #1	1.0
Wellsite Bike Rest #2	1.0
Allison	73.5
Woodcrest	7.0
TOTAL	443.5 AC

Note: [C]Facilities function as a community park.

Existing Funding Mechanisms: Maintenance and Acquisition

Revenue for the operation, maintenance and acquisition of parks and recreation facilities derives from a number of sources. The City's General Fund provides funds to the Community Services Department for its programs, staff, and the maintenance of existing parks and recreation facilities under its jurisdiction. After the passage of Proposition 13, the City turned to the creation of Park Maintenance Districts to finance upkeep of new neighborhood parks. However, even with these districts in place, financial constraints prevent the City from maintaining and developing all of its existing neighborhood and community parkland. In 1990, 11 neighborhood and community park sites remained undeveloped.

School parks are maintained by the school districts in which they are located. The Lagoon Valley Regional Park, a Solano County facility, is maintained by the County.

New neighborhood parks and some urban open space lands located in subdivision areas are acquired through dedication or payment of in-lieu fees.

Impacts: Parks and Recreation

Overview. The land use decisions proposed within the General Plan will have the overall effect of requiring the City to acquire and develop additional parkland in all categories for which it establishes standards. A change in these standards is proposed by eliminating the standard for Regional Park and adding a standard for City Park. The City does not have standards for the provision of urban open space and park types classified as "Other." Nevertheless, because the Plan proposes the urbanization and annexation of areas of Solano County open space and agricultural lands near the City, some of these lands are considered suitable for acquisition and protection as part of the City's parks inventory within the classification of urban open space. In order to meet the Plan's standard of five acres of parkland per 1,000 population, new park sites are designated on the Plan map. The following impacts have been identified for each park type:

Impacts: Neighborhood and Community Parks

Neighborhood and community parks are the building blocks of the City's open space system. The impact on neighborhood and community parks is determined by assessing future acreage based upon the General Plan's population forecast. This is done on a citywide basis using an overall distribution

standard of 2.0 acres per 1,000 residents for each category. The General Plan establishes a need for 88 acres of neighborhood parks and 60 acres of community parks.

At a more detailed level, the City's existing inventory of neighborhood and community parks is compared against anticipated residential growth in each planning sector. Some planning sectors, such as the South sector or the West Valleys (North and South), are proposed for extensive residential development and will require large amounts of new parkland. Other sectors, such as Central and Northwest, are largely built-out and need to increase their neighborhood and community parkland by more modest amounts. The analysis of future parks needs also takes service area standards into account. All residential areas of the City are required to be served by at least one neighborhood park within a one-half mile service area.

Impacts: Regional Park

Under the proposed General Plan, the acreage and configuration of the Lagoon Valley Regional Park will change. To accommodate a business park (or institutional use) on the east side, an exchange of land has been proposed. The City would give 20 acres of parkland on the east side of the lake for private development and, in return, receive 13 acres in the view corridor on the west side. The net loss of parkland would be 5 acres.

In addition to the loss of acreage, other impacts to the Regional Park are: disturbance of the park's scenic and visual recreational qualities, a degradation of ambient environmental qualities due to increased air and noise pollution, and a possible decrease in fishing and swimming opportunities. The Park is also expected to lose importance and function as a regional facility and increasingly gain importance as a City of Vacaville park.

Impacts: City Park

National standards establish a need for a city park in jurisdictions whose population has exceeded 50,000 residents. At 109,000 projected future residents, Vacaville would need at least 200 acres of city park.

Impacts: Urban Open Space

Although the City does not set standards for the acquisition and provision of urban open space, it has acquired important natural areas that define urban edges, contribute to the City's natural setting and sense of place, protect habitats, and increase outdoor recreational opportunities. In general, urban open space areas have been parcels that were either too difficult or hazardous to develop. The City also maintains a system of multipurpose paths along sections of Alamo and Ulatis creeks (creekways) and has adopted a Creekways Ordinance which establishes policies for the maintenance, protection and development of the City's urban creeks.

Residential and commercial development proposed under the General Plan will increase development of open space areas at the City's edge. Many parcels located at the proposed urban limit line may be suitable for consideration as future additions to the City's urban open space inventory. Of chief concern are flatlands in the Lower Vaca Valley and the bluff area to the north, which provides a significant visual resource to the City.

Mitigation: Neighborhood and Community Parks

To meet future neighborhood park need for a General Plan buildout population of 109,000, 88 acres will have to be provided. The General Plan proposes 14 neighborhood parks totalling 86 acres. Together with existing neighborhood parks acreage, proposed neighborhood parks fall short of meeting the City standard by 2.0 acres.

The General Plan proposes three new community parks (Elmira, Noonan and Laguna Hills) totalling 65 acres. Together with existing community parks acreage (158 acres), the provision of community parks exceeds the City standard by 5.0 acres. Cumulatively, the provision of neighborhood and community parks exceeds the City standard by 3.0 acres.

Mitigation: Regional Parks

No mitigation is proposed for the net loss of 5.0 acres of parkland. Each of the identified impacts will be addressed as follows:

Disturbance to scenic and visual recreational values: Planning for development in the Lower Lagoon Valley is carried out under the policies established for Policy Plan Areas (see growth management policies.) These policies seek to ensure high-quality standards of design which reflect environmental, among other, planning concerns. Among the proposals made for

offsetting the degradation of the scenic rural character of the Regional Park's setting is the requirement that buildings in the foreground be low-profile and screened by landscaping. A 400-foot wide open space area is planned at the southwest corner of the Park as a visual corridor. These mitigation measures are designed to ensure that views of the Park and lake are not fully blocked by development. The loss of the Regional Park's scenic and visual character which derives, in part, from its rural setting, is identified as a severe impact, with only partial mitigation possible.

Loss of ambient environmental quality conducive to outdoor recreation due to an increase in noise and air pollution caused by projected traffic trips and proposed road improvements and reconfiguration along the Park's western edge: A Policy Plan and EIR are being prepared for the Lower Lagoon Valley to assess potential environmental impacts and to identify mitigation measures. The place of a new arterial road along the western edge of the lake is considered to be a trade-off between environmental and circulation concerns. Noise from this road can be reduced by planting a screen of trees or shrubs along its eastern edge. This screen will, however, block views of the Park.

Degradation of fishing and swimming opportunities due to surface runoff from urban development: The Lower Lagoon Valley Policy Plan will identify measures to minimize urban pollutants in surface runoff flowing into the lake.

Mitigation: City Park

National park standards establish a distribution ratio of 100 acres of city park/50,000 residents. The General Plan proposes a comprehensive distribution standard of 5 acres/1,000 residents which includes 1 acre of city park/1,000 residents. At this ratio, Vacaville requires 109 acres of City park to meet future city park needs. The General Plan proposes 170 acres of city park to be located on both sides of Browns Valley Parkway near Nut Tree Airport. A municipal golf course is proposed as a use within the City Park.[6] Creating a City Park at this site will require purchasing open space lands currently owned

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[6]Parks policies call for an overall design concept for the City Park to ensure its physical integrity and require the City to determine whether a golf course is a use compatible with the expressed purpose of the City Park.

by Solano County and used as an airport safety area. No additional mitigation measures are needed.

Mitigation: Urban Open Space

The General Plan establishes policies for protecting hillsides and ridge areas above the 25 percent slope line. Some of these areas may be acquired by the City for permanent protection and inclusion in the inventory of parks and recreation facilities; others are expected to remain in private ownership. Plan policies call for joint efforts with neighboring cities and the Solano County Farmlands and Open Space Foundation to purchase important parcels of open space lands in urban areas. The proposed Parks and Recreation Facilities Master Plan, to be prepared after adoption of the General Plan, will establish specific policies to address the preservation, maintenance, and acquisition of urban open space. General Plan land use decisions designate open space corridors along all creeks and creek tributaries in areas proposed for urban development in conformance with the City's Creekways Ordinance.

WATER SUPPLY AND DISTRIBUTION

Setting: Water Supply and Distribution

The City of Vacaville provides water service within the City limits from groundwater and surface-water sources. The groundwater is provided from nine wells in a well field on the eastern side of the city along Elmira Road. Surface water is drawn from the Solano Project, via the Putah South Canal, part of a large water-distribution system in the County, and is treated at the water-treatment plant on Elmira Road near the well field. The third source of water is from a recently completed North Bay Aqueduct (NBA). The treatment plant for this water should be on-line by mid-1990. A network of pipes distributes the water throughout the City from the well field and the water-treatment plant. General Plan Figure 5-2 shows the water system and potential improvements.

The City's water-distribution system consists of various-sized pipes. Most of the City's treated water and water from the well field is directed to the Elmira Road 30-inch water main and then to the central business district by a 12-inch line and a 24-inch line. From the central business district, several 8-inch, 12-inch, and 18-inch lines branch off to the northwest sector, the northeast sector, and the south sector. One 12-inch line also branches off for the Elmira Road 30-inch water main down Peabody Road to the south sector, and a 12-inch line along Nut Tree Road runs from the well field to the south sector and to the northeast sector. A 30-inch water main has been installed from Elmira Road to the NBA water treatment plant.

The existing distribution system has several weaknesses. In the northwest sector, high elevations cause low pressure in the residential neighborhood along North Orchard Avenue. Existing reservoirs have not corrected this problem, and the water supply could become critical during a fire in this area. Throughout the City, many lines will not be able to meet increased demands when new development or infilling occur.

Additional reservoirs have been recommended to correct problems with low pressure in certain areas, as well as to ensure adequate water supplies for emergency use. A five-million gallon reservoir at Vaca Valley Parkway west of Brown's Valley Parkway currently is being designed and should be completed by 1990; a second water reservoir will be needed within the next five years.

Water Entitlements and Production. Table 4.5-D is a summary of amount of water, expressed in acre-feet (AF), that the City has available on an annual basis to serve existing (and future) residents and businesses.

TABLE 4.5-D
WATER ENTITLEMENTS

Solano Project (Putah South Canal)	5,600	AF/yr.
Well Field (Estimated Safe Yield)	6,000	AF/yr.
North Bay Aqueduct	6,100	AF/yr.
1972 Solano Irrigation District Entitlements	5,875 (previously estimated)	AF/yr.
Total	23,575	AF/yr.

As part of the Water Master Plan, there will be sufficient water treatment capacity to meet peak water demands both before and after the North Bay Regional water treatment plant comes on line, for 5 to 7 years, assuming a moderate residential growth.

It should be noted that the Solano Irrigation District water entitlements are only available for commercial, industrial, and public use. The maximum residential population that may be served with current entitlements and the City's wells is approximately 90,000. In summary, the updated supply and demand calculations, shown in Table 4.5-E, are as follows:

- **Water Production:** There is sufficient water system peaking capacity for the next 5 to 7 years, assuming moderate growth (950 single-family units, 300 multi-family units; 240,000 square feet of commercial development and 240,000 square feet of industrial development per year). Additional wells to be constructed along or east of Leisure Town Road should add even more to this peaking capacity. Additional water production capacity is also available at the NBR plant, which is presently 13.3 mgd.

- **Water Entitlements:** Depending on the rate of development, there are sufficient total water entitlements available for residential growth to 1995-97. Commercial/industrial growth has sufficient entitlements to the years 2004 to 2016 with the 1972 Solano Irrigation District water (at 5,875 AF/yr.). This is contingent

on acquiring short-term additional outside water entitlements. After 1997, additional water entitlements will need to be acquired to sustain a moderate residential growth rate. Potential sources include: well-field expansion, Central Valley Project, conservation and reclamation. The City is also pursuing an additional water entitlement through a possible agreement with SID (See Appendix 3).

The current production and entitlement requirements have been financed by the selling of water rights. Future improvements, as outlined in the 5-year CIP plan, will necessitate an adjustment to the current fees.

TABLE 4.5-E
PROJECTED WATER SUPPLY AND DEMANDS, 1987-90
(mgd - million gallons per day)

Year	Demands Peak Day (mgd)[b]	Maximum Available Supply (mgd)	Firm Capacity (mgd)[a]	Excess Firm Peak Day Capacity (mgd)
1987	19.60[b]	23.14	20.48	0.88
1988	20.37	23.14	20.48	0.11
1989	21.74	25.28[c]	23.09	1.35
1990[d]	23.05	38.61[d]	36.42	13.37

Notes: [a]Firm Capacity: Elmira Water Plant operating at 100 percent capacity, and the largest well out of operation (2.19 mgd).
[b]Assumes that the California Medical Facility uses 1.9 mgd peak-day.
[c]New well added (2.0 mgd).
[d]The new 13.33 mgd North Bay Regional plant on line.

Source: Vacaville Department of Public Works.

The City's well field provides operational flexibility during peak needs. Because of their age, however, two wells should be planned for replacement within five years.

Planned Improvements: Water Supply and Distribution

The water system, which has entitlements to serve up to 90,000 people, will need improvements to serve buildout under the General Plan, which will involve up to 110,000 people. Specific items addressed in this section include:

- o Amount of water production capacity needed.
- o Volume and location of storage reservoirs.
- o Location and size of pumping stations.

The concepts, sizes, and locations of improvements are intended only to provide a broad overview at the type of improvements needed to serve buildout development. The following information should be used in this context, recognizing that further analysis is required to update the water system master plan.

Projections of buildout development in each planning sector were used to project water demands which, in turn, were used to determine needed improvements. The improvements were selected and sized using standard water system design criteria.

Pressure Zones. In Vacaville, several different pressure zones are needed to serve development as a result of a wide range of building pad elevations throughout the City. Currently, the largest pressure zone, "Zone 1," is designed to serve development which is below 220 feet and above 120 feet in elevation (currently these limits are exceeded). The storage reservoirs in the Zone 1 system are placed at elevations above the building pads in order to establish and regulate the pressures. Where building pads are higher than those in Zone 1, higher pressure zones are required. Currently, there are three pressure zones above Zone 1 including the Vine Street, Wykoff and Hidden Valley zones.

Pressure zones are an important consideration with water service for the West Valleys (Sectors 8 and 9). The West Valleys are at a higher elevation than Zone 1, so a higher pressure zone (Zone 2) is needed. Zone 2 will require

booster pumping facilities to move the water to the zone, pipelines to distribute water throughout the zone, and storage reservoirs to establish pressures and to provide emergency and operational water requirements.

Reservoirs and pumping stations should be provided for both the West Valley North (Sector 9) and the West Valley South (Sector 8). However, the reservoirs in both areas should be set at the same elevation, so that the distribution systems can be tied together as a single new pressure zone. This arrangement will provide a reliable system because of the multiple pumping and storage facilities.

The high water level in the West Valley reservoirs is proposed to be set at 419 feet. This elevation would provide service to land with elevations between 215 and 315 feet which includes most of the land identified for development in the sketch plans. (Additional pressure zones would be required for land above 315 feet.)

Another area of concern is the northwest portion of Vacaville within the existing City limits in the vicinity of Alamo Drive, Fruitvale Avenue and North Orchard Avenue. This portion of the City is built above 220 feet elevation and, as a result, this area is experiencing low pressures. Therefore, it is recommended that Zone 2 be extended into this area. If development occurs in the West Valleys, then facilities for this area and the West Valleys can be linked together into one large zone. If development does not occur in the West Valley, then the Zone 2 system in the existing residential area will need to be expanded with alternative financing.

Water Demand Projections. Buildout average and maximum day water demands are approximated between 30 mgd (million gallons per day) and 60 mgd, respectively. By contrast, average and maximum day water demands in 1989 were 11.94 mgd and 22.38 mgd, respectively.

Water Supply Improvements. Currently, the City produces water via nine water wells and a diatomaceous earth water treatment plant (DE plant). Additionally, a regional water treatment plant (NBR plant) which will serve Vacaville and Fairfield is under construction at the present time. The initial phase of construction will include 13.3 mgd for Vacaville, but the design is intended to accommodate future expansion for more capacity. Additional water production improvements are identified below.

Wells. Wells will need to be replaced as they become old. Typically, a well should last from 30 to 50 years depending upon construction and operating characteristics. Some of the City's wells were constructed in the 1950's. The DE plant will require improvements to increase booster pumping

capacity, to install new chemical addition equipment, and to make several other improvements. Improvements at the DE plant will partly be required in response to more stringent regulatory requirements. If the DE plant is not maintained, its capacity must be replaced elsewhere. If the well field and DE plant are maintained at their current capacities, then the 13.3 mgd currently under construction at the NBR plant plus another 24.0 mgd will be required to meet buildout demands. The additional capacity will need to be provided at the NBR plant or at other locations as appropriate.

Pumping Stations. Pumping stations will be needed for Zone 2 in the West Valleys and in the northwest portion of the existing City limits. We recommend that one pumping station be dedicated to the West Valley South and a second be dedicated to the West Valley North. The pumping station for the West Valley North would also serve the northwest portion of Vacaville within the existing City limits.

Storage Reservoirs. As demands increase in Zone 1, new storage reservoirs will be needed to maintain the level of service provided by the existing reservoirs. For complete buildout within the urban service area, an estimated 20 million gallon of additional storage will be required in Zone 1. This volume can be constructed in increments of any size although 5 million gallon increments are cited herein.

New storage reservoirs will also be required for Zone 2 in the West Valleys and for other pressure zones which may be established in the future.

Pipelines. Substantial pipeline improvements will be required as growth proceeds in the urban service area. Some of the improvements will be needed to serve currently developed areas, but the majority of the pipelines will be needed to convey water to future areas of development.

The number of pipeline improvements needed to serve the planned urban service area is substantial, and it is not feasible to describe all of the improvements herein. Listed below are brief descriptions of major transmission pipeline improvement projects. Sizes and alignments will be subject to detailed analysis at the master plan and preliminary design levels. Major transmission lines are lines of 12 inches in diameter and greater.

- o New pipeline on north Browns Valley Road and Vaca Valley Parkway.
- o New pipeline along Nut Tree Road and I-505 between Elmira Road and Vaca Valley Parkway.

- New pipeline on Leisure Town Road from Elmira Road, to I-80 and into Sector 4.

- New pipeline on the southeast perimeter of the planned urban area from Peabody Road to Elmira Road.

- New pipeline from Peabody Road, west on California Drive, then northwest on Alamo Drive to I-80. The pipeline reduces to 24 inches and continues on Alamo Drive to Buck Avenue.

- New pipeline from the NBR treatment plant (assuming all future treatment capacity is provided at the plant site).

- New pipelines for the West Valley North connecting the pump station to the reservoirs and also on Pleasants Valley Road to provide a connection with the West Valley South.

- New pipelines for the West Valley South connecting the pump station to the reservoirs and forming a portion of the loop through the commercial and industrial areas.

Summary of Improvements. Listed in Table 4.5-F and shown in General Plan Figure 5-2 are major infrastructure improvements needed to serve the urban service area under the General Plan. These improvements give a general framework for providing water service in Vacaville. However, the list is by no means all inclusive. Additional improvements will be needed to rehabilitate and replace existing facilities, and to modify and supplement existing facilities to meet changing needs. Also, additional improvements will be needed in response to unanticipated development conditions and to serve developments on a local basis.

Table 4.5-F identifies the size and quantity of each improvement. However, the sizes and quantities must be interpreted as approximate as they will be refined in conjunction with detailed planning and design.

Phasing. On a large scale basis the most significant phasing considerations are with development in the West Valleys. Before development in these areas can proceed, the pumping stations, and reservoirs for Zone 2 must be in place and the major transmission facilities must be installed. Transmission facilities include major pipelines within the West Valleys extending from the intersection of Peabody Road and California Drive to Alamo Drive and Buck Avenue.

Additional large scale phasing requirements will primarily be dictated by the locations where the major growth occurs. For example, if Sector 4 develops quickly, then pipelines conveying water into this area must be constructed early.

Small scale phasing requirements are difficult to evaluate at the General Plan level of detail and are not addressed herein. These should be addressed at the master plan and design levels of detail.

Improvements which are anticipated to be needed by 1995 are marked by an asterisk ("*") in Table 4.5-F. These include improvements listed in the 1990 Draft Water System Master Plan for implementation in this time frame plus others such as the needs for the West Valleys which were not specifically addressed in the 1990 Draft Water System Master Plan. In reference to these 5-year items, it is important to note that priorities can change quickly as anticipated development patterns change.

TABLE 4.5-F
PROPOSED WATER SYSTEM IMPROVEMENTS

All quantities and sizes are approximate and subject to revision (MGD-Million Gallons per Day; MG-Million Gallons; GPM-Gallons per Minute; LF-Linear Feet).

Item	Quantity[1]
Water Production	
DE Plant Improvements (2)*	Process Change
NBR Plant (1990)*	13.3 MGD
NBR Plant (1995-97)*	6.7 MGD
Additional Treatment Capacity Needs To Serve Buildout	24.0 MGD
Replacement Wells (over 20 years)*	6 wells
Reservoirs	
Zone 1 Reservoir*	5.0 MG
Zone 1 Reservoir	5.0 MG
Zone 1 Reservoir	5.0 MG
Zone 1 Reservoir	5.0 MG
West Valley South Reservoir (Zone 2)*	4.0 MG
West Valley North Reservoir (Zone 2)*	2.0 MG
Northwest Reservoir (Zone 2)*	3.0 MG

Continued

Table 4.5-F -- *Continued*

Item	Quantity[1]
Pumping Stations	
Wykoff/North Zone 2 Pump Station*	1760/3780 GPM
West Valley South Pump Station*	3200 GPM
Major Transmission Pipelines[3]	
Peabody Rd. (So. of California Dr.)*	3,500 LF
Peabody Rd. (Above 36" Pipe to NBR Plant)	9,500 LF
Alamo Dr. (I-80 to Buck)*	5,700 LF
Alamo Dr. (Peabody to I-80)*	10,000 LF
Nut Tree Road/I-505	15,500 LF
Allison Drive	11,000 LF
Southeast	22,500 LF
Sector 1, Central Downtown	
Rehabilitation*	Miscellaneous
Sector 2, Northwest Foothill Drive	
Foothill Drive*	6,000 LF
Alamo Creek Crossing*	1,000 LF
Sector 3, North	
Browns Valley Road/Aldridge Road	8,000 LF
Sector 4, Northeast	
Leisure Town Road/Midway Road	15,000 LF

Continued

Table 4.5-F -- *Continued*

Item	Quantity[1]
Unnamed Future Road	9,000 LF
Midway Road	5,000 LF
Akerely Drive	4,500 LF
Sector 8, West Valley South	
Pump Station to Reservoir	5,000 LF
Unnamed Future Road	2,000 LF
Unnamed Future Road	8,000 LF
Sector 9, West Valley North	
Foothill Drive to Reservoir	5,000 LF
Pleasants Valley Road	9,500 LF
Cherry Glen Road	8,000 LF
Sector 10, South	
Gonsalves-Lockie Development*	9,500 LF

Notes:

[1]All quantities and sizes are approximate and subject to revision.

[2]Improvements at the DE plant are contingent upon the recommendations in the proposed 1990 *Disinfection and Operations Study*.

[3]The reservoir sizes and lineal feet of pipeline are approximate and subject to detailed analysis as part of the Citywide Water Master Plan Update to be done subsequent to adoption of the new General Plan.

*Improvements anticipated to be needed by 1995.

Impacts: Water Supply and Distribution.

The General Plan will require the provision of additional water, to serve 110,000 people, 20,000 more than can be served under the current entitlements. Additional population will require more pressure in order to serve all portions of the City, as well as additional pumping stations, storage reservoirs, and pipelines. The planned improvements are, at a conceptual level, part of the proposed Plan, but project-specific details and proposals are yet to be determined. Environmental impacts of the proposed improvements will be assessed on a project-by-project basis.

Mitigation: Water Supply and Distribution.

Full mitigation of the impacts on the water system by the amount of development that the proposed Plan would allow would require new water supplies and construction of new water treatment facilities and water lines. Implementation of the Solano Irrigation District (SID) Agreement would guarantee sufficient water supplies through General Plan buildout. (See Appendix 3.) The proposed Plan requires the City to update the Water Master Plan to include improvements needed to serve the population projected for 2010 and beyond. (Policy 5.1-I2) The proposed General Plan also requires that urban services be available prior to development to serve any new development. (Policy 2.2-I7) With full implementation of Policy 2.2-I7, impacts are mitigated to the extent that development consistent with the proposed Plan could not occur until adequate water service was made available.

WASTEWATER COLLECTION AND TREATMENT

Setting: Wastewater Collection and Treatment

The City's wastewater-collection system was evaluated in the 1987 *Vacaville Trunk Sewer Study* done by Brown & Caldwell. This study identified trunk wastewater lines and major pumping stations which have inadequate capacity and noted the following deficiencies:

- Two lengths of trunk wastewater lines between the California Medical Facility and the Elmira Road main trunk line;

- A short section of 12-inch line along Alamo Drive east of Tulare Drive;

- o A short section of 12-inch line southwest of the Brown's Valley Road and Markham Avenue intersection; and

- o The 33- and 36-inch main wastewater line along Elmira Road and Vaca Station Road from Leisure Town Road east to the Easterly Wastewater Treatment Plant.

City crews also have noticed problems with an 18-inch wastewater line between Browns Valley Road and the airport.

Persistent maintenance requirements of some trunk wastewater lines indicate additional existing deficiencies. City crews need to flush several mains totaling approximately 4,700 feet of wastewater mains every week.

In the future, a portion of the existing trunk sewer system (on the order of 30 percent) will have inadequate capacity to collect increased levels of wastewater generation. To increase capacity, replacement or relief piping will be necessary.

Planned Improvements: Wastewater Collection and Treatment.

The existing plant has an average dry weather flow (ADWF) capacity of 6.7 mgd (million gallons per day) and a peak wet weather flow (PWWF) capacity of 13.4 mgd. ADWF during the past five calendar years is shown in table 4.5-G.

The existing plant is being expanded to an ADWF capacity of 10 mgd average daily dry weather flow and a PWWF capacity of 27 mgd. This expansion will give the City four to six years of treatment capacity needs based upon an average yearly residential growth rate of 950 single-family units and 300 multi-family units.

Current expansion of the plant is also designed to allow the plant to be increased in capacity by another 2 mgd for a total capacity of 12 mgd. This additional expansion would give the City another approximate four years of capacity. Again, the number of years is based upon an average residential growth rate of 950 single-family units and 300 multi-family units.

TABLE 4.5-G
AVERAGE DRY WEATHER FLOW

Year	Average Daily Dry Weather Flow
1985	6.7 mgd
1986	7.3 mgd
1987	6.9 mgd[a]
1988	7.0 mgd
1989	7.2 mgd

Note: [a]The decrease from 1986 to 1987 was likely because of the closure of an industrial user with large wastewater flows (Basic Vegetable, a food dehydration plant).

mgd = million gallons per day.

Based upon the above information, the existing plant, with the expansion to 10 mgd will serve the City until at least 1994. A Sewer Master Plan, to be completed in Summer 1991, will identify treatment options available to meet the needs of additional capacity beyond the planned expansion to 10 or 12 mgd. Said options could include expansion of current facilities (Easterly Wastewater Treatment Plant and Industrial Wastewater Treatment Plant) and construction of new facilities.

The City will be conducting a study as required by the Regional Water Quality Control Board to analyze the plant effluent impacts on downstream water quality. This analysis may require the construction of an additional wastewater processing step, which may include tertiary treatment.

Further new development in the Northeast sector will generate wastewater at levels beyond the capacity of existing lines. Special new or parallel lines will be needed for this area as it is developed.

Impacts: Wastewater Collection and Treatment

Buildout of the General Plan will require construction of new sewer lines, replacement and upgrading of existing lines, and additional capacity for wastewater treatment. Expansion of the Easterly Wastewater Treatment Plant was evaluated in an EIR, completed in February 1988, and the impacts attributable to this project are comparable to those associated with the plant expansion that would be required for General Plan buildout. This analysis is incorporated by reference.

Reconstruction of existing sewer lines and extension of sewers to serve new areas of development will involve construction impacts. To the extent that lines are contained within existing or planned rights of way for streets and other utilities, these effects will be limited. However, planning for additional trunk facilities is still at the conceptual stage, so detailed analysis of specific effects cannot be undertaken.

Mitigation: Wastewater Collection and Treatment

The City intends to initiate a comprehensive Sewer Master Plan Update in the summer of 1990, with completion scheduled for the summer of 1991. This study will include a detailed analysis of existing and projected sewer flow generation, trunk sewer capacities and lift stations, and treatment plant capacities based upon the adopted General Plan (the subject of this EIR). The Sewer Master Plan also will address expansion of the existing plant beyond the planned expansion to 10 or 12 mgd and analyze how to retrofit the plant to meet possible new state regulations for effluent and treatment requirements.

Proposed General Plan policies for policy plans, a planned growth ordinance, and requirements that new development not generate demand for sewer service that will exceed existing and planned capacity should provide adequate mitigation. In addition, no development is to occur outside the existing service area until adequate public services can be assured, and the City is committed to establishing a monitoring program for areas where infrastructure limits are being reached to ensure that necessary improvements are completed in a timely fashion.

SOLID WASTE

Setting: Solid Waste

A recent survey of disposal site operators in Solano County indicates that each resident of the City of Vacaville Planning Area generates approximately 6.6 pounds of solid waste per day.[1] Table 4.5-H breaks down this daily volume by type. This daily volume sums to approximately 74,000 tons per year for the Vacaville Planning Area, all of which are disposed of at the B & J Sanitary Landfill.

TABLE 4.5-H
COMPOSITION OF WASTE DELIVERED TO DISPOSAL SITES IN THE BAY AREA

MATERIAL CLASSIFICATION	% BY WEIGHT
Mixed paper	32.5
News print	8.8
Corrugated paper	6.5
Ferrous metal	5.1
Non-ferrous metal	0.9
Plastics	4.0
Garden wastes	13.9
Other organics	16.3
Glass	8.1
Other inorganics	3.9

Source: California Refuse Removal Council, *Waste Generation and Disposal in California*, 1982.

[1] *Solano County Solid Waste Management Plan Revision*, 1988.

Impacts: Solid Waste

Growth induced by the General Plan will increase the solid waste generated within the Vacaville Planning Area to approximately 130,000 tons per year, a 76 percent increase. According to the 1988 *Solano County Solid Waste Management Plan Revision*, Vacaville will need to reserve approximately 3.5 million cubic yards of landfill space to accommodate the waste flow to the year 2005. (See Table 5.2-B.)

Mitigation: Solid Waste

B & J Landfill has an estimated capacity of 9.6 million cubic yards. Given this capacity, the facility has an estimated life-span of 45 years, until 2035. The General Plan should call for adopting and implementing a Source Reduction and Recycling program, as required by AB 939, to divert 25 percent of the waste stream from the landfill by 1995 and 50 percent by the year 2000. Methods to reach these goals should include curbside recycling, composting, collection of household hazardous wastes, and aggressive education programs. In addition, the General Plan should call for the implementation of the policies of the *Solano County Solid Waste Management Plan*. This document calls for a 30 percent reduction in the waste stream volume through resource recovery programs.

FIRE PROTECTION

Setting: Fire Protection

Fire service and emergency paramedic response in the City are provided by the Fire Department. Operations are out of three fire stations with headquarters centrally located in Station #1 near Vacaville's Downtown. Station #2 is located on Nut Tree Road and Station #3 is in the northern part of the City on Vaca Valley Parkway. A fourth station is in the planning stages for the southern section of the city, and will be located on Alamo Drive near Peabody Road. Full operation of this facility should occur within the next five years.

The Fire Department is equipped with six engines (to pump water) and two ladder trucks. However, one of these trucks is scheduled for sale. In addition to its fire-fighting responsibilities, the Department maintains three ambulances for emergency medical services (EMS).

Vacaville's Fire Department believes that fire protection was not adequately addressed in the existing (1980) General Plan. Specific concerns of the Fire Department include the following:

- **Response Time:** The Department has experienced a dramatic increase in emergency calls in recent years. Simultaneous alarms present problems, particularly if fire suppression and EMS services are required at the same time. If urban expansion occurs outside the existing area planned for development under the 1980 General Plan, new stations will be needed to ensure adequate response time.

- **Water Pressure:** Anticipated improvements to the City's water system will directly affect the level of fire service provided. The construction of additional reservoirs and upgrading of specific water lines will make more water available for fire fighting purposes and relieve some water-pressure problems. However, problems with low water pressure may persist in the North Orchard Avenue area due to the minimal elevation difference between home pads in this district and the bottom of the planned reservoir at Browns Valley Road.

- **Development Standards:** Vacaville is the only city in Solano County to have adopted an ordinance requiring sprinkler systems in multifamily residential as well as commercial development. This is in keeping with the City's goal of maintaining a small-fire-response capability while requiring new development to provide as many fire protection features as possible. Unfortunately, this approach has not proved wholly adequate. The City's rapid growth has caused an increase in fire emergencies undermining the effectiveness of the sprinkler ordinance. The Department believes that part of the solution may come in the form of tighter development standards which prohibit the use of fire-prone materials such as wooden shakes and shingles in building construction for roofs and outside walls.

- **Personnel and Equipment:** Less than a decade ago, the Vacaville Fire Department was a volunteer force that could draw on a pool of 60-70 persons. The change to a professional department has meant a decrease in the number of personnel available to respond to a fire. Fire suppression is a 24-hour-a-day job with 12 firefighters on duty at all times. Another four off-duty personnel can be called in when needed to bolster fire-fighting capacity. The Department maintains a mutual aid agreement with the Vacaville Fire Protection District which services unincorporated areas adjacent to the City.

  Maintenance of the existing ratio of 0.7 fire suppression and rescue personnel per 1,000 residents to 2010 would require an additional 32 persons. (See Table 5.2-C.) Additional fire stations and administrative personnel would also be necessary. Planning and

financing these improvements will require commitments of land, personnel and public funds.

- **Wildland Fire Hazards:** The Vacaville Planning Area includes wildlands, notably those formed by the forested slopes of the Vaca Mountains and its tributary spurs, the Cement Hills and the English Hills. Grasslands in rural districts form an additional component of the wildlands inventory. The Fire Department is very conscious of the need for planning in rural and wildlands areas in or near the City as a result of several severe fires in the past years which damaged property and endangered lives.

  According to the California Division of Forestry, California has a wildland fire potential unequaled by any other state and few areas in the world. Several thousand wildfires are caused annually by the combination of highly flammable vegetation, long, dry summers, rugged topography, and a population that works, recreates, and, increasingly, chooses to live in wildlands areas. Such fires are extremely destructive: they damage natural areas and property, and occasionally cause loss of human life. The potential for future losses increases as residential and recreational developments encroach further into wildlands areas.

  Some steps that can be taken to reduce wildfire hazards include enforcement of strict building codes, implementation of fire-safe practices, proper road construction, and adequate water systems. A draft of Statewide standards for fire protection is due to be published in January 1991, delineating fire prevention standards as part of the Public Resources Code. Above all else, the Division of Forestry stresses the importance of proper land-use planning and zoning which designates where and under what conditions people should live in wildlands relative to their exposure to the hazard of wildfire. A Fire Hazard Severity Scale has been developed which provides local government land-use planners a practical and logical system for classifying and delineating areas of varying severity of fire hazard. The scale utilizes three environmental characteristics as criteria for determining levels of fire hazard: fuel loading, fire weather, and slope. Each factor is assigned a value which, when multiplied in matrix form, produces three designations of fire hazard: (1) Moderate, (2) High Hazard, and (3) Extreme Hazard. By mapping these fire-hazard areas within a planning jurisdiction, land-use planners can determine standards and policies for the use and development of this land.

General Plan Figure 9-4 illustrates locations within the Vacaville local responsibility area classified as presenting a Moderate, High, or Extreme Hazard of wildlands fires. Understandably, much of the extreme and high hazard area covers the slopes of the Vaca Mountains in the west and the hilly terrain of the English and Cement hills. The Eastern Hillside area falls under State responsibility for fire protection, with a general hazard rating of very high. These areas present all three conditions for extreme fire hazard: steeply sloped terrain, heavily wooded vegetation, and very dry, hot weather during extended periods of the year. The beautiful sunny weather that attracts people to Vacaville creates ideal conditions for wildfires. The entire Vacaville Planning Area is classified as Class III (Extreme) fire weather.

Impacts: Fire Protection

Additional development will require additional local fire protection services. Other impacts could arise from the location of new development outside the urban area.

Fire protection services are limited in areas of rugged or difficult terrain. Development in these areas will require additional equipment and coordination. Safety Element policies 9.3-I2, 9.3-I3 and 9.3-I4 in the Wildland and Urban Fires Section address this issue.

Mitigation: Fire Protection

- The City should implement policies to ensure that funding is in place and facilities, including fire stations, are constructed in a timely fashion to serve new development.

- The City should establish Mello-Roos Community Facilities districts or other funding mechanisms to provide standby fire protection services if it becomes necessary because adequate funding will not otherwise be assured.

- The City should create or adopt development standards that reduce the risk of fire in high and extreme fire hazard areas.

- Consider adoption, in an ordinance, and implementation of the State of California Firesafe Standards.

- Consider adoption, in an ordinance, of the standards specified in Section 4290 of the Public Resources Code. Section 4290

Regulations, still in draft form, are also known as the State Responsibility Area Fire Safe Regulations. When adopted, they would establish minimum wildfire protection standards for building, construction, and development in State Responsibility Areas. They would also constitute the basic standards of the California Department of Forestry and the California Department of Forestry and Fire Protection in relation to wildlands fire protection. Section 4290 Regulations may contain standards appropriate for portions of Vacaville.

- Policy 5.1-I6 of the General Plan states the City's intent to develop a Public Safety facilities plan to ensure adequate service to the Planning Area.

POLICE PROTECTION

Setting: Police Protection

The Vacaville Police Department serves that part of the Planning Area within the City limits. The Department is staffed with one Chief, two Captains, three Lieutenants, ten Sergeants, 53 Patrol Officers, and thirty-five civilian support personnel. They currently have a ratio of 1.1 sworn officers per 1,000 population, and .54 non-sworn personnel per 1,000 population. The Department does not have current figures on response times, but goals include achieving a three minute response for emergency/life-threatening calls and five minute response for priority calls. Computer-aided dispatching automatically prioritizes and stacks calls.

The Solano County Sheriff's Department has divided the County into five beats, including Vacaville, Fairfield, Vallejo-Benicia, Dixon, and Rio Vista. The first four beats are patrolled by two deputies 24 hours a day, with an average County response time of five to eight minutes. As of 1988, the area to be covered was 820 square miles, with a population of approximately 18,000[2]. The target officer-to-population ratio in Solano County is 2.4:1,000. The English Hills area has posed a problem in the past, due to difficulty in locating the house from which a call originates; common mailboxes and a lack of clearly marked addresses may impede response time. According to the Solano County *DEIR for the Rural Residential Update, an Amendment to the Land Use and Circulation Element*, May 1988, the north Vacaville area is currently understaffed, with only two patrol cars for all of the Dixon and

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[2]Solano County Department of Environmental Management, *DEIR for the Rural Residential Update, an Amendment to the Land Use and Circulation Element, Part of the Solano County General Plan*, May 1988.

Vacaville areas, stretching from Lagoon Valley to the northern and eastern county boundaries.

Impacts: Police Protection

By 2010, the Vacaville area of Solano County now served by the Solano County Sheriff's Department is expected to be a part of Vacaville, and will be served by the Vacaville Police Department. Maintaining a ratio of 1.1 sworn officers per 1,000 population leads to a projected need of 120 officers for General Plan buildout. This is an increase of 51 sworn personnel over those presently employed (See Table 5.2-D). If a ratio above 1.1 officer per 1,000 population is desired, a greater number of personnel will be required.

Maintaining a ratio of .54 non-sworn personnel per 1,000 population would lead to a total projected need for 59 persons, an increase of 24 employees in the non-sworn personnel category.

Mitigation: Police Protection

Policy 5.1-I6 of the proposed Plan states the City's intent to develop a Public Safety facilities plan to ensure adequate service to the Planning Area.

4.6 OPEN SPACE AND AGRICULTURAL LAND

Setting: Open Space and Agricultural Land

The urbanization of prime farmland in the United States is recognized as a national problem. Agricultural lands near California's major metropolitan regions have been particularly affected by development. Cities once sustained by acres of fertile orchards and farms have seen these replaced by new tract homes and commercial shopping centers. Population and growth projections for the Bay Area point to further rapid development of Solano County cities and increased pressure on open space and agricultural land.

Agricultural land not only serves as an important crop and range land resource, it provides visual open space for the Vacaville community, clear identification of the land's use and utility, and visible evidence for visitors about where the city begins and ends. A community can be favorably characterized by the amount and treatment of open space lands within its boundaries and between it and the neighboring communities. Effective visual community separators have been formed by expanses of agricultural lands between cities or communities. Common practice in northern California cities has been to surround the developing community with a wide swath of agricultural acreage or "greenbelt," thereby preserving the compact city form and allowing (even encouraging) the continued use and development of farmlands on the periphery.

The Vacaville Planning Area includes large agricultural tracts of lands in the Lagoon Valley, Pleasants Valley, and east of Leisure Town Road to Highway 113. A large portion of these lands are visible from major roads in the Planning Area, and as such serve as a visual open space resource. Highway 80 slices diagonally across the Planning Area, offering rural views from the community separator between Fairfield and Vacaville and again from Leisure Town Road to Dixon. The formation of the Mt. Vaca foothills on both sides of Highway 80 creates a dramatic natural entry point into Vacaville from Fairfield. Lagoon Valley and Pleasants Valley offer low foothills and acres of privately owned land serving as another visual open space resource for the community.

Soils and Agricultural Resource Classification. Central to any analysis of farmland resources is the classification of soil according to its inherent physical characteristics and productivity. The fundamental classification system used by the United States Department of Agriculture's Soil Conservation Service distinguishes different soils by factors including geologic content, pH balance, slope, permeability, thickness, and susceptibility to erosion. Soils with similar chemical and physical properties are grouped into "series," while soils which are found in a characteristic and repeating geographic pattern are grouped into "associations." Maps, usually at a scale

between 1:20,000 and 1:24,000 and suitable for analyzing small parcels, are then published along with the data in county soil surveys.

Figure 5 illustrates generalized soils for the Vacaville Planning Area while Table 4.6-A gives a brief description, Storie Index rating, and Land Capability Classification for each soil in the area. The best agricultural soils in the area are the Brentwood, Sycamore and Yolo Associations found in Lagoon Valley and east of the City limits at Leisure Town Road.

In addition to being classified by soil, land in California is also defined and ranked by four different classification systems which indicate the land's relative productivity and importance to local, state, and national agriculture.[1] These four systems are the Storie Index, the Land Capability Classification, the Williamson Act, and the Important Farmland Inventory.

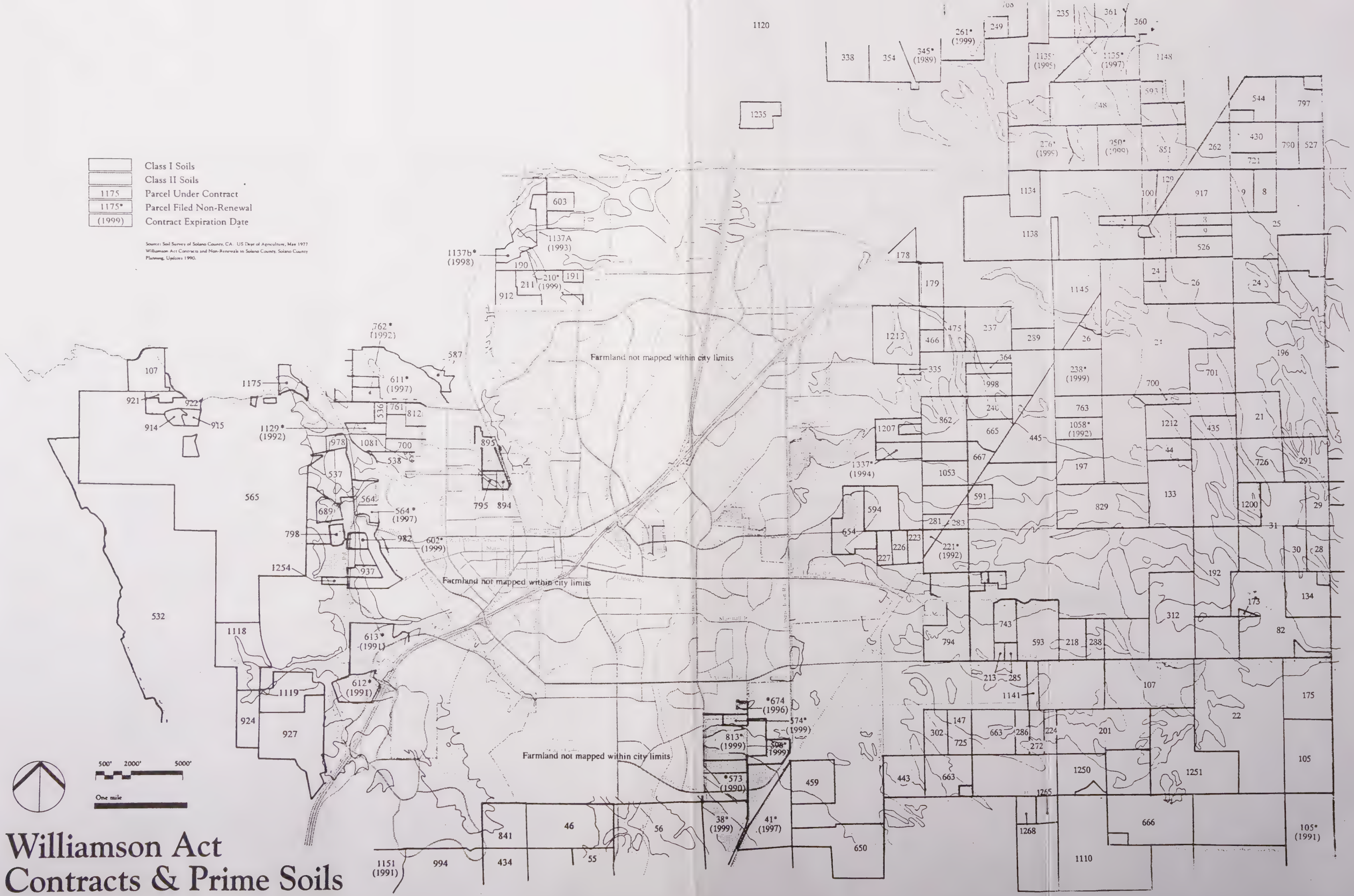
Storie Index. The Storie Index rates soils based on productivity data from the 1920s and 1930s. Four factors, soil origin and depth, surface texture, slope, and a composite factor including drainage, salinity, alkalinity, acidity, and degree of erosion, are multiplied to obtain a ranking between 0 and 100. A rating between 80 and 100 usually indicates prime farmland. These ratings can be mapped by using the Soil Conservation Service county survey maps and tables which index soils to their Storie ratings.

The Storie Index's strength is that it allows specific areas, regardless of crop, to be ranked in a quantitative fashion. Its weakness is that much of the data is outdated and, because it deals only with the physical and chemical properties of the soil, it fails to account for climate, availability of water, distance to market, and importance of specific croplands to the local economy.

Land Capability Classification System. The Land Capability Classification (LCC) System used by the Soil Conservation Service groups soils into eight categories (Class I-VIII) according to soil and climate characteristics of individual sites obtained from precise soil surveys. The characteristics are grouped into these 13 areas: effective soil depth, surface layer texture, permeability, drainage, water holding capacity, erosion and flooding hazard, salinity, alkali levels, toxic substances, slope, frost-free days per year, and climate indicators. Based upon site-specific interpretations

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[1]Much of the following discussion is a summary of "The Prime Question: Defining California's Agricultural Lands," by Eileen Allen, in *Room to Grow: Issues in Agricultural Land Conservation and Conversion*, prepared by the State of California Office of Planning and Research, June 1983.



Williamson Act Contracts & Prime Soils

Figure 5

of this data, the soil is then grouped into one of the eight classes depending on its limitations. Class I soil has virtually no limitations, Class II some, and Classes III-VIII increasingly restrictive ones. While Class I and II soils are considered prime, Class III-VIII soils can also be highly productive. Like the Storie ratings, these classifications can be mapped by using the soil maps and indices provided by Soil Conservation Service county soil surveys.

The LCC's strength is that it is based on precise, scientific surveys of soil and climate at specific sites, and employs easily understood categories. The system's weakness is that many of its maps are outdated, it applies only to field crops, leaving out such crops as rice, strawberries, and most fruits, like the Storie Index it omits such factors as water availability, distance to market, and the importance of various croplands to the local economy, and finally, does not account for changes in land characteristics and farming technology over time.

Williamson Act. The Williamson Act of 1965 (California Land Conservation Act, Administrative Code, Section 51200 *et seq.*) is intended to discourage the unnecessary and premature conversion of agricultural land to non-agricultural uses by taxing land according to its income-producing value rather than "highest and best use." In return, farmers agree not to develop their land for 10 years. Contracts are automatically renewed every year provided a notice of non-renewal or cancellation is not filed. Cancellation allows landowners to quickly terminate a contract in exchange for paying a penalty of 12.5 percent of the land's fair market value, but requires "extraordinary circumstances" and a public hearing. Appendix 4 shows conditions for approval of contract cancellation, under Government Code Sections 51282 and 51284. Contract nonrenewal requires no hearing or special circumstances and simply lets the contract run out in 10 years.

Under the Act, land placed under contract is classified as either prime or non-prime/open space. Prime farmland is defined as any which meets one of the following criteria: it is ranked Class I or II under the Land Capability Classification, is rated 80 through 100 by the Storie Index, supports one livestock animal per acre per year, is planted with fruit or trees, vines, bushes or crops which have a non-bearing period of less than five years and will return at least $200 per acre per year, or has produced a crop of $200 or more during three of the last five years.

Land in Williamson Act contracts in the Vacaville area is shown in Figure 5. Both active contracts and those which have not been renewed are shown. As can be seen, both the lower Vaca Valley and almost all the land in Pleasants Valley is under active contract with the exception of the two parcel contracts (Nos. 612-613) expiring in 1991. Appendix 5 contains a list of

non-renewals filed for Williamson Act contracts in Solano County.

Active contracts exist in Pleasants Valley and Vaca Valley along Gibson Canyon Road, Cherry Glen Road, Leisure Town Road, and in the area between Vaca Valley Parkway and Cantelow Road. A roughly diagonal band of contracted lands defines the eastern edge of the Planning Area near Vanden, Hawkins and Kilkenny roads, although little of the rural-residential and agricultural lands east of Leisure Town Road is similarly constrained.

The contracted lands contain some of the richest soils in the Planning Area. The Vaca Valley is classified as Class I Soil as is most of the land forming Pleasants Valley. The Hawkins Road area drained by Alamo Creek is also a Class I Soil area. These soils can reach a depth of 30 feet of loam and constitute an important regional and national resource.[2]

Important Farmlands Inventory. The Soil Conservation Service in conjunction with the State Department of Conservation's Farmland Mapping and Monitoring program employs the Important Farmland Inventory to classify land as either prime, of statewide importance, unique, or of local importance.

To be classified as **Prime**, land must possess a reliable source of water, a water table maintained at a level sufficient to allow crops to grow, warm temperature range and long growing season, pH level between 4.5 and 8.4, sodium content of less than 15 percent, flooding no more than once every two years on average, soil erodibility and slope of less than 2 percent, permeability of 0.15 centimeters per hour in the top 5 centimeters, a surface layer in which less than 10 percent of the rock fragments are over 7.6 centimeters long, and a minimum rooting depth of 1 meter.

Lands of statewide importance have no minimum rooting depth limitation or permeability restriction. They may also hold more water, be more saline or alkaline, and have a moderate erosion hazard.

Unique farmland is that other than prime or of statewide importance which produces one of California's 40 leading economic crops, such as grapes, artichokes, avocados, and dates. Soil characteristics and irrigation are not considered. The final classification under this system, **farmland of local importance**, is a flexible category which allows counties to designate lands of importance to the local economy but which do not fall into any of the other classifications. Solano County does not have a list of lands that are

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[2]Neil Havlik, Director of the Solano County Farmland and Open Space Foundation.

considered farmlands of local importance.

California's Farmland Mapping and Monitoring program provides county farmland inventory maps at 1:100,000 with a minimum mapping unit of 10 acres and overlays at 1:24,000 to be used with U.S. Geological Service quadrangle maps.

The strength of the Important Farmland Inventory system is that it uses specific, measured criteria for prime land, is flexible because of the local importance category, involves local people, and employs the most factors to derive easily grasped categories. Its weakness is that due to the 10-acre minimum parcel size, it cannot be used for precise surveys of individual sites. In addition, the irrigation requirement may exclude land from the prime and statewide importance categories and the data may become obsolete because the evaluation takes place only once. Figure 5 shows that much of the farmland around Vacaville qualifies as either prime land or that of statewide importance.

TABLE 4.6-A
MAPPED SOILS FOUND IN THE VACAVILLE PLANNING AREA

Storie	Class	Symbol	Mapping Unit
			PRIME FARMLAND SOILS
81	1	BrA	Brentwood Clay Loam, 0 to 2 percent slope
73	2	BrC	Brentwood Clay Loam, 2 to 9 percent slope
69	2	Ca	Capay Silty Clay Loam
46	3	Cc	Capay Clay
49	3	CeA	Clear Lake Clay, 0 to 2 percent slope
100	1	Ra	Reiff Fine Sandy Loam
77	2	RnC	Rincon Loam, 2 to 9 percent slope
72	2	RoA	Rincon Clay Loam, 0 to 2 percent slope
65	2	RoC	Rincon Clay Loam, 2 to 9 percent slope
68	2	Sr	Sycamore Silty Clay Loam
85	1	Ss	Sycamore Silty Clay Loam, drained
100	1	Yo	Yolo Loam
85	1	Yr	Yolo Loam, Clay Substratum
90	1	Ys	Yolo Silty Clay Loam
			SOILS OF STATEWIDE IMPORTANCE
38	4	AcC	Altamont Clay, 2 to 9 percent slope
42	3	AsA	Antioch-San Ysidro complex, thick surface, 0 to 2 percent slope
37	4	ASc	Antioch-San Ysidro complex, thick surface, 2 to 9 percent slope
65	2	DbC	Dibble-Los Osos Loams, 2 to 9 percent slope
51	3	MnC	Millsholm Loam, Moderately Deep Variant, 2 to 9 percent slope
49	3	SfA	San Ysidro Sandy Loam, Thick Surface, 0 to 2 percent slope
39	4	Wc	Willows Clay

Continued

Table 4.6-A -- *Continued*

Notes:	Class System: Class 1: 80-100 Storie points Class 2: 60-80 Storie points Class 3: 40-60 Storie points Class 4: 20-40 Storie points Class 5: 0-20 Storie points
Symbol:	Adapted from USDA Soil Survey Map of Solano County, 1977 Publication.
Mapping Units:	USDA Soil Survey Maps of Solano County, 1977.

Annexation Standards. The Solano County Local Agency Formation Commission's annexation standards prevent urbanization of lands under agricultural preserve contract and discourage incorporation of outlying parcels or pockets of land if (1) land for urbanization is available elsewhere within city limits and (2) if urbanization of these parcels will have a deleterious effect on adjacent lands under agricultural preserve contracts. All parcels with unrenewed contracts in the Vaca and Lagoon valleys would be subject to these standards, and the burden of proof would rest with the City of Vacaville if it proposed annexation of these lands.

Vacaville, like all Solano County cities, is required by the Solano County LAFCO to prepare a Comprehensive Annexation Plan for a 15-year time-frame. The City's Comprehensive Annexation Plan (CAP), adopted in March 1985, is effective until the year 2000. The CAP can be amended but should be flexible enough to preclude major changes.

One of the chief objectives of LAFCO's standards is to "provide planned, well-prepared, efficient urban development patterns with appropriate consideration of preserving open space lands within such patterns." (California Government Code, Section 45774.5).

The CAP includes the following policies to protect agricultural land:

- o Direct development to available non-prime agricultural land;
- o Increase overall residential densities;
- o Establish development limits adjoining agricultural areas;
- o Reduce residential densities adjoining agricultural areas.

Further, LAFCO policy is to prohibit annexation of land under an agricultural preserve contract "unless an agency protested the establishment of the contract and was upheld by LAFCO, and/or unless the adverse effects of the annexation on the economic integrity of lands in adjoining preserves are reasonably mitigated."

Lands included within agricultural preserves under the Williamson Act are to be protected except where land is proposed by the General Plan for eventual urbanization and where the owner had already filed for non-renewal of the contract.

Finally, even though a given application for annexation may qualify under the 10-year filing clause for removal, LAFCO must evaluate the potential effect of a proposed annexation on neighboring lands within agricultural preserves to avoid premature pressure for the conversion of such lands to urban use.

Agricultural Economy. The Solano County Crop report, published yearly, reports agricultural production and average values of crops grown in the County. Field crops (151,016 acres) and pasture lands (164,300) comprise the bulk of agricultural lands, with vegetable, fruit and nut acres, and seed crops produced from the remaining agricultural acres. Tomatoes were Solano County's leading agricultural crop in terms of gross value, with acreage increasing from 16,000 acres in 1987 to 18,688 acres in 1988, and yielding a gross revenue of $31,956,500 dollars. Field corn and sugar beets were the second and third leading crops in terms of gross value.

The Vacaville Planning Area encompasses some of the richest farmland in Solano County. The area east of Leisure Town Road to the Planning Area Boundary at Highway 113 supports both field and row crops. Major crops grown are tomatoes, sugar beets, wheat, field corn, beans, and barley. Fewer

acres are presently devoted to seed and oil crops, such as sunflowers, beans, vegetable seeds, and grains. The area around the Suisun Valley and Winters supports agricultural production from tree crops such as almonds, walnuts, apricots, and prunes. Almonds and pastureland can be found in the Dixon area, at the northwest edge of the Planning Boundary. Table 4.6-B shows Solano County crop values for selected leading crops grown in the Vacaville Planning Area.

The yields for field and seed crops in the County have approximately doubled from 1978 to 1988 (45 million to 80 million, and 2 million to 4 million), while animal production gross revenue has increased from 12 to 30 million dollars per year. Table 4.6-C shows the major crops and their characteristics for Solano County, 1988. The Table also includes a column indicating net loss or gain of agricultural land per crop between 1980 and 1988. Sugar beets show a net loss in acreage from 1980, reflecting the demand price of only $36 per ton in 1988, while a 1980 ton sold for $49.79. Wheat showed a similar loss in acreage and reduction in price per ton, while tomatoes gained significantly in acreage and price per ton ($26.70 per ton to $36.00 per ton in 1988).

TABLE 4.6-B
SOLANO COUNTY SELECTED CROP VALUES
1988

Crop	Irrigated Acres	Acreage Value/Acre	Total County Crop Value
Tomatoes	18,688	$1,710.00	$31,956,500
Sugar Beets	18,528	846.00	15,674,700
Wheat	50,000	302.50	15,125,000
Field Corn	32,000	528.00	16,896,000
Beans	9,000	625.00	5,625,000
Barley	5,000	256.80	1,284,000

Source: Solano County Department of Agriculture Crop Report, 1988.

TABLE 4.6-C
SOLANO COUNTY
MAJOR CROPS AND THEIR CHARACTERISTICS, 1988

Crop	Acreage	Total Production (tons)	Total Crop Value (1988) (In Dollars)	Change in Acreage (1980-1988)
Tomatoes	18,688	672,768	31,956,500	+2,377
Sugar Beets	18,528	435,408	15,674,700	-1,583
Wheat	50,000	137,500	15,125,000	-200
Field Corn	32,000	153,600	16,896,000	+6,700
Almonds	2,194	704	1,430,200	-776
Walnuts	2,583	3,306	3,173,800	+693
Cattle (Head)	40,000	200,000	13,320,000	+13,500 head

Source: 1980 and 1988 Solano County Department of Agriculture Crop Reports.

Impacts: Agricultural Land

Agriculture and Open Space. Plan policies regarding Vacaville's desire to remain a freestanding city are affected by development proposals for agricultural lands in the Lagoon and Cherry Glen valleys.

The Lagoon Valley, as shown in the General Plan, will no longer serve as a portion of the agriculturally based community separator between Fairfield and Vacaville. The ridge near the North Texas Street exit into Fairfield and the Lagoon Valley development of Vacaville will be the remaining break between the two cities, a reduction in the area and visual strength of the separator.

Agricultural areas along Pleasants Valley Road and Cherry Glen Road are also scheduled to be converted into a golf course residential development, resulting in a loss of an older, rural community and accompanying open space on the western edge of town. Agricultural land north of the Alamo and Encinosa Creek divide, and slopes over 25 percent are prevented from development; only

TABLE 4.6-D
PRIME LANDS AFFECTED BY DEVELOPMENT

	Acreage Outside City Limits			
		Prime Farmland		
Affected Planning Sector	To Be Developed	Total	To Be Developed	Percent of Total
Vaca Mountain Foothills	0	0	0	0
Northwest	220	200	200	100%
North	1,559	519	479	92%
Northeast[1]	1,442	205	40	20%
East of Elmira	0	23,385	0	0
East[2]	1,123	1,130	588	52%
Southeast	103	103	103	100%
South	760	764	725	95%
Southwest	35	40	0	0
West Valley North	1,135	1,132	1,019	90%
West Valley South	1,077	450	432	96%
Central	0	0	0	0%
Planning Area Totals	7,654	27,928	3,586	

Notes: [1]Excludes 203 prime acres in unincorporated pocket within City limit.
[2]Excludes 165 prime acres in unincorporated pocket within City limit.

Source: Blayney-Dyett.

these 25-percent-plus slopes will remain in a natural state with the proposed development. The area of Leisure Town Road (beyond the greenbelt buffer area) will remain primarily agricultural in use.

The Planning Area has been evaluated by sector to determine net loss of prime agricultural lands to planned urbanization. The sectors listed in Table 4.6-D would be affected by General Plan policies on new development. Acreage listed by sector in the Table is not to be confused with acreage described by area in the text.

Evaluation by Area. The agricultural lands located along Pleasants Valley Road have been slated for Golf Course Residential Development. This development will replace the agricultural use of Class I Prime agricultural lands, of which 8 parcels remain in Williamson Act contracts. The loss of prime soil agricultural lands in this area is the greatest in acreage in the Planning Area by far, totaling approximately 1,019 acres.

In Lower Lagoon Valley, Residential Estate development would occur on approximately 482 acres of Class II Prime Agricultural land. Planned business park development in the area would not affect prime soils but would reduce the amount of valley open space by about 300 acres.

Development in the northwest pocket of land outside the City limits would affect approximately 220 acres of Class I prime agricultural land near Ulatis Creek. Three tracts of land remain in Williamson Act Contracts. Rural residential housing planned for the northern section of the Planning Area would affect 460 acres of Class II Prime land, while the mixed development scheduled for the northeastern portion of the area incurs a loss of 165 acres. Seven tracts of land remain in Williamson Act Contracts, with 3 contracts expiring by 1999.

The lands East of Leisure Town Road beyond the 1500-foot greenbelt would remain primarily in agricultural use, but development along Leisure Town Road from Highway 80 to the Southern Pacific Railroad Tracks would convert 1,400 acres of Class I and II prime lands.

Development of the proposed reservoir on the southern edge of the City limits would not directly affect the prime lands that lie beside it.

The remaining County pockets within the City limits are 100 percent Class I prime agricultural land, totalling approximately 368 acres lost to industrial or residential uses.

LAFCO Approvals. Development proposed for outside the current City limits cannot be approved unless LAFCO approves changes in the City's Comprehensive Annexation Plan of March 1985. Generally, LAFCO prefers to guide development away from prime agricultural land, and most lands under agricultural preserve contracts, unless such actions would not promote planned, orderly, and efficient development.[3] Current development proposals for land outside the City limits affect land in 28 current Williamson Act Contracts, compromising approximately 2,430 acres. 3,964 acres of prime agricultural land will be affected.

Agricultural Economy. The impact of losses of agricultural lands would affect the crop economy in relation to the value of the crop and land in question. A loss of tomato acreage would be more damaging to the local economy than a loss of barley acreage, at current demand and prices. Specific crop information for the areas experiencing the greatest loss in agricultural acreages is not available, but would be necessary to determine the extent of economic loss.

Mitigation: Agricultural Land

The Plan's proposal for an agricultural service area is intended to mitigate impacts on prime farmland by providing a definite geographic limit to urbanization.

A reduction in the urban service area could preserve more prime agricultural land, but parcel sizes and location could limit the long-term viability of such a mitigation measure. Additional mitigation for agricultural lands may be imposed as conditions of annexation.

Such conditions might include:

- A study to assess the economic impacts of the loss of particular crops during farmland conversion.
- A study and consideration of a farmland protection program that utilizes such land-use planning tools as transfer of development rights, purchase of development rights or conservation easements, and farmland trusts.
- Consideration of a Right-to-Farm Ordinance.

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[3]LAFCO, *Standards and Procedures for the Evaluation of Annexation Proposals Submitted to the Solano County Local Agency Formation Commission*, April 1984.

4.7 GEOLOGIC AND SOILS HAZARDS

Setting: Geologic and Soils Hazards

The County of Solano is located in two California geographic provinces: the Coast Ranges and in the Central Valley.[1] The western one-third of Solano County is situated in the northern California Coast Ranges province and encompasses the entire Central Solano County Study Area as used in this report. The eastern two-thirds of the County lies in the Sacramento portion of the Central Valley Province.

Both the Coast Ranges and the Central Valley provinces are the result of geologic activity occurring during the Mesozoic and Cenozoic eras. These two eras span nearly 200 million years and include alternating periods of mountain building, volcanic activity, erosion and deposition that created the present-day landforms. The Coast Ranges contain complexly folded and faulted rocks of Mesozoic and Cenozoic strata. The Mesozoic rocks include marine Cretaceous sandstone and shale, and variably metamorphosed clastic and volcanic rocks of the Franciscan assemblage which forms the core of the range. The Cenozoic rocks consist of clastic strata of continental and marine origin, as well as large areas of Pliocene-Pleistocene volcanic rocks.

Physiography of the region is varied. Generally from west to east, landforms common to Solano County are the Coast Ranges, low hills and dissected uplands, low alluvial plains and fans, and flooded basins. The Coast Ranges extend up to elevations of 2,800 feet. Low hills and dissected uplands are evident in the north from Vacaville to Putah Creek. The eastern two-thirds of the county is comprised mostly of low alluvial plains and fans ranging in elevation from about 100 feet at the edge of the Coast Ranges foothills to near sea level at the eastern border. This area is the location of the principal groundwater basin.

Geologic Hazards. Figures 9-1 and 9-2 in the General Plan show geologic and seismic hazards in the Planning Area.[2] The seismic risk for the Vacaville Planning Area is similar to many other seismically active areas of California. Nearly all earthquake damage is due to groundshaking and the

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[1]The following geological information was adopted in large part from the HUD *EIR for Proposed Residential Development 1980-1985, Central Solano County Study Area*, 1979.

[2]Preliminary maps titled: Landslide Hazard Map Number 14, Relative Landslide Susceptibility Map Plate Number 14A, and Geologic Map Plate Number 14A, from the California State Division of Mines and Geology, 1988.

secondary effects of groundshaking, including groundfailure and fire damage.

Groundshaking, Groundfailure, and Liquefaction. A survey of soils within the Planning Area revealed a number of potential constraints in development. The Planning Area is situated between two seismically active regions: the San Francisco Bay region and the Central Valley region. The San Andreas, Hayward, Calaveras, and Green Valley/Concord faults are the most capable of contributing earthquakes of great magnitude. (See Table 4.7-A.) However, there are no known faults within the Planning Area. Within the vicinity are two "inferred" faults: the Midland and the Kirby Hills Fault. These two faults are concealed by recent alluvium and show no surficial evidence of seismic activity.

There are other potentially active faults in or near the Planning Area which should be noted. These include the Lagoon Valley Fault, possible faults in Vaca Valley, and fault traces in northwestern Fairfield.[3]

The following categories were used in identifying open space areas where development should not occur because of potential geologic hazards.

Area 1. Least Susceptible Area. Landslides and other features related to slope instability are very rare to non-existent in this area. Included within this area are topographically low-lying valley bottoms and alleviated floodplains. Part of the area may be underlain by material that lacks the strength to support steep slopes (such as unconsolidated alluvium) but occupies a relatively stable position due to flatness of the slope (lacks potential energy). Land within Area 1 will probably remain relatively stable unless the topography is radically modified.

Area 2. Marginally Susceptible Area. This area includes gentle to moderate slopes underlain by relatively competent material or colluvium that is

Area 3. Generally Susceptible Area. Slopes within this area are at or near their stability limits due to a combination of weaker materials and steeper slopes. Although most slopes within area 3 do not currently contain landslide deposits, the materials that underlie them can be expected to fail, locally, when modified because they are close to their stability limits. Debris flows may originate within area 3 and flow downslope, sometimes at high speeds, to impact land included within areas 1, 2, 3, or 4.

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[3]U.S. Department of Housing and Urban Development, *Proposed Residential Development, 1980-1985, Central Solano County Study Area, DEIR.*

TABLE 4.7-A
EARTHQUAKE FAULTS THAT IMPACT THE VACAVILLE PLANNING AREA

Fault Name	Maximum Magnitude	Recurrence Interval (Long-Term Slip Rate (years))	Maximum Distance From Fault Liquefaction Can Occur
San Andreas	8.4	1,000	90 miles
Calaveras	7.3	300	63 miles
Hayward	6.9	200	28 miles
Concord/ Green Valley	7.0	200	34 miles

Note: This table does not include inferred faults with no surface expression, such as the Midland and Kirby Hills Fault or potentially active faults, such as the Lagoon Valley Fault.

Source: Earthquake Mapping Project, March 1980, ABAG. *Working Paper #4, Liquefaction Potential Mapping.*

Area 4. Most Susceptible Area. This area is characterized by steep slopes and includes most landslides in upslope areas, whether apparently active at present or not, and slopes upon which there is substantial evidence of downslope creep of surface materials. Slopes within Area 4 should be considered naturally unstable, subject to failure even in the absence of the activities of man.

Existing Landslide Areas. Areas identified as having had slope failure.

Not Mapped Areas. These areas are not mapped because of significant modification by grading and/or development or mining activity.

The areas mapped are general in nature; field studies are necessary to determine detailed, site-specific aspects of slope stability.

A 1983 report issued by the Association of Bay Area Governments (ABAG) indicates the maximum Richter Magnitude for earthquakes on active faults in the greater San Francisco Bay Region. Using this data, along with information of bedrock geology and surficial deposits, ABAG has prepared a maximum groundshaking intensity map. According to this map, anticipated maximum groundshaking intensities in the Planning Area range from Intensity C (very strong) to Intensity E (weak). Generally, within the Planning Area, the distribution of degrees of intensity corresponds with underlying geology.

The relationship of the San Francisco Intensity Scale to the Modified Mercalli Scale is shown in Table 4.7-B. The significance of the levels of shaking is that they can be used to estimate dollar cost of damage using statistical studies from past earthquakes. Specifically, the damage cost factor[4] is 5 percent at Intensity D for a wood-frame, one- or two-story building that meets the current requirements of the building code. For example, a residence valued at $100,000 should expect to experience, on the average, $5,000 in damage. However, the dollar cost of damage depends on many complex variables, including how well the various structural elements in the building are tied together, earthquake characteristics and foundation conditions. Obviously, if the earthquake triggers groundfailure or if it causes a fire, the damage can be much higher.

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[4]The "damage cost factor" is equal to the cost of repair divided by the replacement costs. This quotient is multiplied by 100 to express the result as a percentage.

TABLE 4.7-B
DAMAGE COST FACTORS FOR BUILDINGS
ASSOCIATED WITH SELECTED INTENSITIES[a]

San Francisco Intensity	Modified Mercalli Intensity	Damage Cost Factor (Percent)
C	VIII	7
D	VII	5
E	VI	2

Note: [a]For wood-frame dwellings meeting the modern building code standards.
Source: Darwin Myers Associates.

A major source of earthquake-related damage and casualties in Northern California has been groundfailure generated by seismic shaking, including landslides, lateral spreads, ground settlement and surface cracks. Many of these failures are caused by liquefaction (the transformation of a cohesionless deposit from a solid state to a liquid state as a consequence of increased pore pressure and increased effective stress). Often this transformation results from the cyclic loading of an earthquake, and the cohesionless deposit acquires a "mobility" sufficient to permit either horizontal and/or vertical movements. Materials that are most susceptible to liquefaction are clay-free, loose, uniformly graded, fine-grained sands that lie within 50 feet of the surface. (See Table 4.7-C.)

Liquefaction susceptibility can be expressed as the product of three parameters:

- Likelihood of finding cohesionless sediments within a map unit;
- Likelihood that those sediments (when saturated) would be susceptible to liquefaction; and
- Likelihood of finding the sediments saturated.

In calculating liquefaction potential, ABAG considered three factors: liquefaction susceptibility; distance from active faults; and earthquake magnitude. Based on this methodology, the surficial deposits in the Planning Area can be divided into three categories of relative liquefaction potential: moderate, low, and very low. (See General Plan Figure 9-2.)

TABLE 4.7-C
LIQUEFACTION SUSCEPTIBILITY

Type of Deposit	Symbol of Flatland Deposit	Overall Relative Susceptibility	
Bedrock	Br	-0%	Very Low
Alluvial Fan and Plain	Qpa	≤0.1%	Low
Artificial Fill	Qhaf	0.1%	Moderate
Alluvial Fan and Plain (medium to coarse grain)	Qhac, Qham	0.2%	Moderate

Source: Earthquake Mapping Project, March 1980. ABAG. *Working Paper #4, Liquefaction Potential Mapping.*

Characteristics of Landslide Deposits Relevant to Land-Use Planning. Landsliding takes place when the downward pull of gravity on earth materials overcomes the frictional resistance of the materials to downslope movement. Some important factors that affect slope stability are:

1. **Type of the earth materials.** Unconsolidated, soft sediments or surficial deposits will move downslope more easily than consolidated, hard bedrock.

2. **Structural properties of the earth materials.** The orientation of the layering of some rocks and sediments relative to slope directions, as well as the extent and type of fracturing and crushing of the materials, will affect landslide potential.

3. **Steepness of slopes.** Landsliding will generally take place more easily on steeper slopes.

4. **Water.** Landsliding will generally occur more frequently in areas of seasonally intense rainfall because the addition of water to earth materials will usually decrease their resistance to sliding by: (a) decreasing the internal friction between particles; (b) decreasing the cohesive forces that bind clay minerals together; (c) lubricating surfaces along which slippage may occur; (d) adding weight to surficial deposits and bedrock; (e) reacting with some clay minerals, causing volume changes in the material; and (f) mixing with fine-grained unconsolidated materials to produce wet, unstable slurries.

5. **Ground shaking.** Strong shaking during earthquakes can jar and loosen bedrock and surficial materials, thus making them more unstable.

6. **Type of vegetation.** Trees with deep penetrating roots tend to hold bedrock and surficial deposits together, thus increasing ground stability.

7. **Proximity to areas undergoing active erosion.** Rapid undercutting and downcutting along stream courses and shorelines causes slopes in these areas to be particularly susceptible to landslide activity.

All the natural factors that promote landslide activity are present in the Vacaville Planning Area. In addition to these factors, human activities have had varying effects upon the potential for slope failures, often decreasing it by leveling slopes, building retaining walls at the base of slopes, planting

trees or seeding forests, as well as through soil conservation practices. However, other human activities may increase the potential for slope failures including increasing slope angles for road or building construction; adding water to marginally stable slopes by watering lawns, improper handling of rainwater runoff and use of septic tank drainfields; adding to the weight of marginally stable slopes by building structures as well as adding fill for foundations; and removing natural vegetation. Thus, slope failure, a natural phenomenon that has occurred many times in the past throughout most parts of the Bay region, may continue, and, in fact, may be encouraged and promoted through improper use of the land.

Impacts: Geologic and Soils Hazards

The geologic-hazard information described above was used to draw the General Plan map, in order to determine which areas were unsuitable for development. The areas in which geologic and seismic hazards are severe are designated as Open Space on the Plan.

The General Plan does not provide sufficient information to allow a presumption of geologic suitability of any site. Consequently Plan policies require both geologic and soils studies, and provide for review of applicants' reports by a City-appointed reviewer. General Plan Safety Element policies generally address development of land in areas of geologic hazard. General Plan policies in Section 9.1, Geologic and Seismic Hazards, prohibits development of land with severe or seismic hazard, or with slope over 25 percent.

Mitigation: Geologic and Soils Hazards

Plan policies provide adequate mitigation as described. The City may wish to aid homeowners living adjacent to steep Open Space lands in the formation of Geologic Hazard Abatement Districts, as described in Policy 9.1-I12 in Section 9 of the Plan. In similar districts set up in Bay Area cities, funds from a tax assessment were set aside as a reserve, to be used for preventative measures (such as drainage and revegetation programs) or to deal with emergencies (mud flows, slides, and excessive runoff).

4.8 HYDROLOGY: DRAINAGE AND WATER QUALITY

Setting: Drainage

The City of Vacaville is a part of the 98,500 acre Ulatis Creek watershed. The existing drainage system within the Planning Area consists primarily of a system of creeks which flow in a general east-southeasterly direction and ultimately drain to the Sacramento River via Cache Slough. The major creeks within the City Planning Area are: Alamo Creek and its tributaries Laguna Creek and Encinosa Creek, Ulatis Creek, Horse Creek, and Gibson Canyon Creek.

These creeks are generally in their natural state and alignment through the City. The channels are generally unlined and vary considerably in width and depth. There is one existing reservoir, Laguna Valley Lake, which is tributary to Laguna Creek, and serves a portion of Lower Lagoon Valley. Under existing conditions, considerable amounts of overbank flow occur during major storms in areas where channel or bridge capacities are exceeded. The overbank flows generally occur as shallow ponding, which can be accommodated under existing undeveloped conditions, although flows have also resulted in occasional flooded residential properties, blocked roads, and disrupted traffic. There has been increasing concern about the impacts of upstream urbanization on the downstream channels, which may increase flooding in the existing urban area.

Downstream of the City, the creeks were improved by the U.S. Soil Conservation Service in the 1960's to provide a 10-year level of protection for the agricultural areas east of the City. Improvements consisted of realigning and widening some existing creek channels, constructing new channels, and building several miles of levees. Since completion of these improvements, growth in the urban center has proceeded at a rapid pace. The improved channels of Alamo and Ulatis Creeks downstream of the City are already at maximum capacity and do not have any available capacity to handle increased runoff from new development. There is some excess capacity available in the downstream improved channels of Horse and Gibson Canyon Creeks.

Recently, the City of Vacaville, with the participation of the Solano County Flood Control and Water Conservation District, completed a study of the effect of rapid urban growth on the drainage system. The *Ulatis Creek Watershed Study* dated February 1990 serves as a basis for impact analysis and design of irrigation measures to be included in the General Plan.

The feasibility of constructing a drainage system for ultimate future conditions with channel and structure improvements only (no detention or storage) was evaluated by the City. Such an alternative would require extensive improvements to all the improved channels of Alamo Creek, Upper Ulatis Creek, and Lower Ulatis Creek, which would require additional right-of-way. It would also require extensive improvements to Alamo and Ulatis Creeks through Vacaville. This alternative was not considered feasible due to the very high costs, as well as the environmental impacts (such as destruction of riparian habitat) and institutional considerations involved in extensive modifications to the Project channels, and was not evaluated further.

An alternative to buy all homes that might be flooded without the implementation of detention or channel improvements also was considered infeasible and was not analyzed.

The proposed locations and sites of upstream reservoirs are shown on General Plan Figure 5-2 and are listed in Table 4.8-B.

TABLE 4.8-B
PROPOSED UPSTREAM RESERVOIRS AND CAPACITIES

Reservoir Location	Approximate Flood Control Storage Volume[1] (rounded to nearest 50 ac. ft.)
On Ulatis Creek upstream of Pleasant Valley Road	200
On Encinosa Creek upstream of Pleasants Valley Road	150
On Laguna Creek upstream of Cherry Glen Road	250
On Alamo Creek at Gates Canyon	400

[1]The upstream reservoirs would provide at least a 10-year level of protection.

The upstream reservoirs would reduce the 10-year peak flows upstream of existing and proposed development in the City Planning Area. These preliminary locations and sizes could be modified as the recommended improvements are refined and implemented, as long as the same hydraulic effect (peak flow attention) could be achieved downstream. Based on specific site conditions and future development needs, the required detention storage within each subwatershed might be provided at more than one site.

The upstream reservoir locations would minimize disruption and inconvenience in urban areas during construction. The upstream reservoirs would minimize channel and structure improvements through Vacaville and would mitigate both existing overflows and potential flooding problems on Alamo and Ulatis Creeks by reducing the peak 10-year flows reaching Vacaville. In addition, it would be possible to consider designing the upstream reservoirs to also attenuate the peak flows of less frequent storm events, such as the 100-year storm, in order to provide a higher level of protection for the City.

In the interim, until the upstream reservoirs are constructed, on-site detention by new development on a case-by-case basis would be required immediately. A policy would be instituted to require on-site detention by new development, where practical, for any increase in the 10-year and 100-year peak runoff from the site flows from the site, filling or building within overflow areas, or changing flow paths. In the Alamo Creek watershed upstream of Peabody Road which includes Alamo, Laguna and Encinosa Creeks (West Valley North, West Valley South and Southwest Sectors), post-development 10-year and 100-year peak flows would be reduced to 90 percent of pre-development levels due to the significant impact of proposed development on drainage conditions in that area. In some cases, depending on the sizes and locations of proposed developments, it might be advantageous for a group of developers to work together to provide a common detention basin serving several developments.

If all the upstream reservoirs in the Vaca Mountains could not be built at the same time, staged implementation (of one or several locations) would provide incremental benefits until all reservoirs could be constructed. However, all the upstream reservoirs are needed to fully mitigate existing problems and future impacts from new development. Alamo Creek is the most severely impacted creek under both existing and proposed future conditions. If all reservoirs cannot be constructed at the same time, constructions of the upstream reservoir at Gates Canyon on Alamo Creek would provide some initial incremental benefit. The upstream reservoirs on Laguna and Encinosa Creeks are needed to fully mitigate the drainage problems on Alamo Creek, and to allow for proposed development within existing overflow areas adjacent to Laguna and Encinosa Creeks. While implementing the interim requirement for on-site detention by new development, the City could consider implementing one or

Impacts: Drainage

It is anticipated that proposed development in the Draft General Plan would increase peak flows in the creeks due to a larger proportion of land as impervious surfaces, greater site runoff, and elimination of existing ponding areas. The higher peak flows would impact not only the creeks within the City but also the downstream improved channels. The proposed Plan would locate some residential and commercial development in areas where creeks could overflow.

Evaluation By Sector. Development in the proposed Plan was evaluated with respect to its impact on eliminating existing overflow areas and increasing peak flows in the creeks. Table 4.8-A shows the 10-year peak flows in the creeks for existing conditions and for Draft General Plan conditions. The proposed upstream reservoirs would attenuate the 10-year or greater peak flows in Alamo and Ulatis Creeks to the existing downstream channel capacities without overbank flows and ponding within the City.

Proposed Improvements and Mitigation: Drainage

Drainage improvements are needed to mitigate the impacts of the proposed development in the Draft General Plan due to the Plan's elimination of existing overflow areas and increasing peak flows in the creeks. The proposed drainage improvements focus on Alamo Creek, with its tributaries Encinosa and Laguna creeks, and on Ulatis Creek. These creeks have significant overbank flows under existing conditions, and would experience flooding problems under Draft General Plan conditions unless the proposed improvements are implemented. The other major creeks within the City Planning Area, Horse Creek and Gibson Canyon Creek, have excess capacity in the downstream improved channels and are not anticipated to experience problems under Draft General Plan conditions.

The major proposed drainage improvements to serve the Draft General Plan consist of upstream reservoirs on Ulatis and Alamo Creeks located in the Vaca Mountains east of the City. These improvements are consistent with the recommendations for alternative plans for future conditions discussed in the *Ulatis Creek Watershed Study*.

TABLE 4.8-A
VACAVILLE CREEKS: 10-YEAR PEAK FLOWS,
EXISTING AND PROPOSED GENERAL PLAN BUILDOUT, 2010

Sector	Creek	10-Year Peak Flows[1] (cfs) Existing	Draft General Plan[2]
North	Horse	320	460
	Gibson Canyon	720	720
Northeast	Horse	750	950
	Gibson Canyon	960	960
East	Horse	980	1160
	Gibson Canyon	1000	1010
	Ulatis	3250	5070
Northwest	Ulatis	3430	4200
Central	Ulatis	3000	4440
West Valley North	Alamo[3]	3000	7450
West Valley South	Alamo	3000	7770
Southwest	Alamo	3150	8130
South	Alamo	3510	8560
Southeast	Alamo	3580	8600

NOTES: [1]Cumulative peak flows in the creek at the downstream point in the sector. cfs = cubic feet per second
[2]With no drainage mitigations.
[3]After the confluence with Encinosa and Laguna Creeks.
Source: Camp, Dresser, & McKee, Inc., March 1990.

several of the upstream reservoirs (or possibly large detention basins at other locations) if there is a large enough group of developers or large enough individual development.

It should be noted that the upstream reservoirs as described in the Ulatis Creek Study would provide a 10-year level of protection. However, new development in Vacaville must provide a 100-year level of protection for certain criteria such as: ensuring that finished floor elevations of structures are above the 100-year water surface elevation; and ensuring that new development does not worsen downstream conditions for the 100-year peakflows. (See Policy 9.2-I2.) New development also is responsible for all necessary in-tract drainage improvements.

The available Federal Insurance Rate Maps (FIRM) only address flooding that is associated with existing development, so the cumulative effects of new development will have to be analyzed during the project review and approval process. FEMA is updating the maps, scheduled for release in 1992. These maps will show different 100-year flood areas. The existing maps may understate the 100-year flood plan. Setbacks from stream channels and on-site retention can also help reduce runoff as required by proposed Plan policies 9.2-I2 and 9.2-I4.

Setting and Impacts: Water Quality and Erosion

Runoff from the Vacaville area goes directly or indirectly into local creeks and then into the Delta. New development such as that proposed in the Draft Plan, can cause increased runoff, erosion of slopes and accumulation of debris resulting in localized flooding and creekbank erosion. These increases in erosion and sedimentation are greatest during periods of excavation and construction, leading to potential creek and Delta degradation, diminishing storm drainage capabilities, and compromising habitat value.

Mitigation: Water Quality and Erosion

General Plan policies reduce potential impacts by restricting development near creeks, and by requiring drainage studies as part of project approval. Policies in the Conservation Element would require maintenance of creek setbacks in accord with resource protection regulations (policies 8.1-I2 and 8.1-I5). Safety Element Policy 9.1-I11 would require revegetation of cut-and-fill slopes in order to control erosion. Development in the West Valley would require a drainage study to determine existing capacity and location, and the size of needed improvements. Special area policies in Section 2.3 of the Plan require this.

4.9 BIOTIC RESOURCES

Introduction. The ecosystems of the Vacaville area function as a result of the unique interactions of both commonplace and rare and endangered plants, animals, and fish. A comprehensive inventory of all of these species is beyond the scope of a General Plan EIR, although extensive listings are available in Vacaville project-specific Environmental Impact Reports. (See Bibliography and Appendices 6 through 10.) This EIR section attempts an overview of major habitats in and around the Planning Area, assesses general impacts, and notes appropriate mitigation. Species of Special Status are considered in a separate section, following Biotic Resources.

This EIR measures the changes anticipated in existing conditions as a result of the implementation of the proposed Plan. It does not assume a pristine natural condition as an environmental baseline. Since the mid-1800s, habitats, species diversity and numbers of individuals within species native to the Sacramento/San Joaquin valleys have been diminished or have been eliminated. Plant species have been severely affected by burning, clearing, grazing, cultivation of agricultural crops, and introduction of exotic species. Animal and fish species have suffered from habitat destruction, hunting, trapping, poisoning, pollution, and introduction of exotic species. However, certain native Central Valley species still persist, and, where they have been able to adapt to agricultural practices, flourish; these species are exceptions.

More than a century ago, the area which is today Vacaville, located along the western edge of the Central Valley and bordered by the Vaca Mountains, was comprised of valley grasslands gradually ascending to valley and foothill woodlands west of town. To the north, the valley habitat ascends along a narrow tongue of topographic relief into the English Hills. While urban and agricultural development has transformed much of the Vacaville Planning Area, a variety of remnants of natural environments still remain.

Setting: Biotic Resources

Most of the native bunch grasses which gave the Central Valley its Western prairie-like appearance around Vacaville have been replaced by introduced annuals, both grasses and forbs. Introduced annual grasses and forbs include species such as Soft Chess (*Bromus mollis*), Foxtail (*Hordeum leporinum* and *Hordeum Stebbinsii*) Medusa Head (*Elymus caputmadusae*), Filaree (*Erodium cicutarium*), and Turkey Mullein (*Eremocarpus setigerus*).[1]

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[1]Nolte and Associates, *Vaca Valley Industrial Park EIR*, March 1976.

Because of grazing and development, remaining bunch grasses, as well as many of the introduced grasses and forbs, are limited to hillsides, ridges, isolated pockets along the valley floor, or in sections of isolated or biogeographically distinct valleys, such as Browns Valley.

One of the unique features of this area is the vernal pool, a seasonally ponded depression which supports a highly specialized community of plants and animals. Because of the unusual combination of soils, climate, and hydrology necessary to form the required habitat, vernal pools are inherently uncommon, and limited worldwide to portions of California, South Africa, Chile, and Australia. It is estimated that vernal pools have been diminished by 90 percent in the Central Valley[2]. Vernal pools or remnants of vernal pool habitat are found north of Travis Air Force Base, around Elmira, north of Dozier, and south of Dozier in the Jepson Prairie Preserve.

A variety of animals and plants inhabits the valley grasslands, including small birds and rodents which feed on grass shoots or seeds, such as the Black-tailed Hare and California Meadow Mouse, and predators like the Coyote, Long-tailed Weasel, Gray Fox, Red-tailed Hawk, and Burrowing Owl.

Because of the functional similarity between grasslands and the vegetative cover provided by agricultural land uses, grasslands-adapted species may survive and even prosper in an agricultural environment. Row crop agriculture can provide important plant cover for migratory bird species. Agricultural lands can be used by birds as foraging grounds and sheltered resting places, and provide travel corridors and habitat for small mammals.

Vacaville's existing riparian habitat acts as an oasis and a refuge for many of the wildlife species which forage in the agricultural areas. The riparian habitat is comprised primarily of Ulatis and Alamo Creeks, tributaries Laguna and Encinosa Creeks, Gibson Canyon Creek, several smaller creeks, including the intermittent Horse Creek and Pine Tree Creek, Putah South Canal, a conduit in an extensive reservoir system, and numerous irrigation canals and ditches. (See General Plan Figure 2-1.) Significant amounts of riparian woodland habitat survive along both Ulatis and Alamo Creeks, even though much of their courses lie within the City itself. Both creeks are about 90 percent intact within the City limits.

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[2]As quoted in Waaland, Vilms, and Thompson, *Draft Santa Rosa Plains Endangered Plant Protection Program Report*, April 1989.

Ulatis Creek runs along the western edge of the English Hills, cuts eastward across the City north of Elmira Road, and flows eastward to eventually join the Cache Slough of the Sacramento River. It is channelized only from about the intersection of Ulatis Drive and Nut Tree Road to the east.

Alamo Creek trends in the same direction as Ulatis Creek, but flows on the opposite side of Vaca Valley, and crosses the City on the south side of Elmira Road. Flood control alterations have diverted downstream flow to a straight channel from Nut Tree Road on, crossing the residential area south of Elmira Road and leaving the City in a due east direction. The original creekbed winds northward to Elmira Road, generally following the road's alignment to Elmira where it passes the Easterly Wastewater Treatment Plant, joining Ulatis Creek further downstream.

Though channelized and diverted in areas, Ulatis and Alamo Creeks provide some riparian woodland in the central and eastern portions of the Planning Area. Both creeks contain large stands of oak, willow, and cottonwood, as well as several other tree species, numerous shrubs and vines, and herbs and grasses.[3] (See Appendices 6 and 7.) This riparian woodland, because of its variety of vegetation, permanent supply of food, water, cover, and use as a travel corridor, features a great diversity of animals, including mammals, birds, reptiles, amphibians, and fish. (See Appendix 8.)

Some of the species closely tied to the water include the Green Heron, Belted Kingfisher, Muskrat, and Western Pond Turtle. Birds such as the Mourning Dove, Scrub Jay, and Sparrow inhabit "edge" areas, while the California Quail, Acorn Woodpecker, Plain Titmouse, and Bewick's Wren live in the actual woodland. Other birds are present seasonally, such as the Northern Oriole and Orange-crowned Warbler in summer and Sharp-skinned Hawk and Common Flicker in winter. Because of the creeks' function as a travel corridor, an even greater number of species migrate through a given area than may be found there in one field survey. Almost every mammal in the area, ranging from Shrew and Opossum to Black-tailed Deer and Coyote, is present at times. The Department of Fish and Game notes the presence of important deer habitat, not only along the riparian corridor, but throughout the western and northwestern portion of the Planning Area.

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[3]Telephone Conversation, Bob Farrington, Vacaville Park Superintendent/City Landscape Architect, February 8, 1989.

Horse Creek and Pine Creek trend in a west to east direction, winding around, turning into ditches, and disappearing into the urban developments along their paths. Putah South Canal, passes through the City in a north-south direction and, as a straight-cut improved channel, offers little biological value.

Assorted other small creeks, and drainage and irrigation canals also attract and support various plant and animal species, including vertebrates associated with the Central Valley's wetlands. Such species might include Song Sparrows (*Melospiza melodia*), Mallards (*Anas platyrhynchos*), and others.

As the flat Central Valley gives way to the slopes of the Vaca Mountains, the habitat transitions into valley and foothill woodland. In the lower foothills and on lower ridges with a southern or western exposure, valley woodland features open stands of trees, mostly Blue and Valley Oak, with an understory of annual grasses. Animal residents or visitors might include the Mourning Dove, Western Bluebird, Acorn Woodpecker, Red-tailed Hawk, Golden Eagle, Botta Pocket Gopher, Coyote, and occasionally Bobcat. Foothill woodland features a closed canopy of trees such as those found in the valley woodland, plus others such as Black Oak, California Bay and Big-leaf Maple, and an understory ranging from grasses and forbs to shade-tolerant shrubs. Foothill woodlands are usually found on the northern and eastern slopes, and all the upper elevations of hills and ridges. In addition to those animals found in the valley woodlands, foothill woodlands support the Cooper's Hawk, California Quail, Stellar's Jay, and Opossum, Deer Mouse, and Western Gray Squirrel. (See Appendix 9.) In the Planning Area, both valley and foothill woodlands are concentrated on the hills surrounding Lagoon Valley, and woodlands are additionally found in the English Hills.

In addition to the remnant and partially-transformed natural habitats described above, the urbanized area offers habitat to plants and animals. (See Appendix 10.) From street trees to kitchen gardens, from weed-filled infill lots to community parks, the species described above and dozens of exotics and introduced species survive and thrive in the urban setting.[4]

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[4]Vessel and Wong, *Natural History of Vacant Lots*, 1987.

Impacts: Biotic Resources

The Plan proposes reducing the Open Space and Agricultural Lands within the Planning Area from 45,341 acres to 38,682, a loss of 6,659 acres.[5]

Some of this land is designated for residential uses, since the Plan adds about 20,000 residential units by 2010, a doubling of the existing amount. Some of this land is designated for commercial uses, since the Plan adds about 1,484 new commercial acres to Vacaville, 460 percent increase over the current 408 commercial acres. Some of the land is designated for parks, with a proposed addition of 331 acres of parkland.

The primary impact of implementation of the proposed Plan on Vacaville's biotic resources is the conversion of habitat now existing as Open Space and Agricultural lands to urban uses. This loss of habitat is likely to result in crowding of mobile animal species, the destruction of non-mobile species, the likelihood of attendant loss in total numbers and kinds of animal species, and a loss of plant species. Direct loss of habitat will occur as a result of the removal of trees, shrubs, and grasses.

A direct loss of riparian habitat as a result of implementation of the proposed Plan is not anticipated, since the Plan specifically calls for the preservation and protection of water resource areas, including the Alamo, Encinosa, Gibson, and Ulatis Creek watersheds. (See Policy 8.1-G4.) In addition, when development of adjacent land may affect a waterway, the California Department of Fish and Game (DFG) Code Section 1601-03 gives the DFG direct jurisdiction over any activities that would substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any stream. The DFG often recommends the use of 50 to 100 foot buffers to maintain wildlife habitat; the buffers may include public access trails, depending on the sensitivity of the adjacent habitat. The proposed Plan protects existing stream channels by requiring buffering or landscaped setbacks and storm runoff interception (Policy 8.1-I5), requires the continued imposition of creek setback standards on new development (Policy 8.1-I2), discourages the culverting of creeks of significance to the City (Policy 8.1-I3), requires the development of standards requiring creek restoration following construction

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[5]Total Open Space and Agricultural Lands within the existing City of Vacaville totals 12,297 acres. The 45,341 acres referenced above includes Open Space and Agricultural Lands within the Vaca Mountain Foothills and East of Elmira Sectors, portions of the Vacaville Planning Area where no urban use is proposed.

(Policy 8.1-I4), and encourages the consideration of the establishment of maintenance districts to ensure ongoing care for selected channels and creeks (Policy 8.1-I6).

In addition to State protection, the Vacaville City Landscape Architect has drafted a *Creekways Policy Plan* for Alamo and Ulatis Creeks which has been adopted by the City Council. Proposed actions include inventorying the creeks' animals and plants, setting up maintenance and erosion control/restoration programs, including creeks in adjacent city parks, and writing a 10-year Plan for building bike trails alongside the creeks. The ultimate goal is to transform the creeks within the Urban Service Area into bike lane/linear parks except for those areas identified as Riparian Preserves. While an inventory and maintenance and erosion control/restoration program would be an effective way to reduce impacts of urbanization on wildlife and wildlife habitat, the level of development required for a bike lane/linear park, dependent upon design, could drive off larger animals and potentially damage sensitive creekside habitat, in areas not otherwise protected in Riparian Preserves.

In addition to habitat loss, the conversion to urban uses is anticipated to increase impervious surfaces and thus increase runoff. The increased flooding possibility also places plants and animals at risk. (See Section 4.8, Hydrology: Drainage and Water Quality.) Increased erosion during construction due to the loss of trees, shrubs, and plants which anchor the soil during wet periods is expected to alter habitat, and increased sediment levels in the water may impact species which live in or depend on creek water. Similarly, excavation and wood and debris dumping may impact creek-related species. Depending on the type of standards which the City establishes for creek restoration following construction, this impact may be avoided or reduced to a level of less significance. (See Policy 8.1-I4.)

Water quality will be affected by lawn and garden pesticides, which are expected to run off into storm drains. However, the loss of agricultural lands may decrease the net amount of pesticides and fertilizers which can run off into creeks. The runoff from streets and parking areas, including oil, gas, and other petroleum products, asbestos, and rubber particles is expected to affect creek water quality. Depending on the type of storm runoff interception which the City chooses to implement, creek water quality may be preserved. (See Policy 8.1-I5.)

The presence of humans and cultural activities on lands formerly designated Open Space and Agriculture is expected to cause disturbance to wildlife, and hunting by domestic pets could reduce populations of small rodents

and birds. Reduction of the rodent and bird population reduces habitat value for birds of prey and for predators such as the gray fox.

Implementation of the proposed Plan is anticipated to lead to a decline in air quality. (See Section 4.2, Air Quality.) Levels of Carbon Monoxide are expected to more than triple existing conditions by 2010, Total Organic Gases to increase by 280 percent, and levels of Nitrogen Dioxide are expected to increase by 375 percent. Such an erosion of air quality is likely to have deleterious effects on plant and animal species, in addition to the health effects on humans.

To supply enough water for the City of Vacaville by 2010, construction of a series of upstream reservoirs is supported as a part of the proposed Plan. The construction of these reservoirs was analyzed as a part of the *Ulatis Creek Watershed Study* published in February 1990. The major proposed drainage improvements consist of reservoirs on Ulatis Creek upstream of Pleasants Valley Road, on Alamo Creek at Gates Canyon, on Encinosa Creek upstream of Pleasants Valley Road, and on Laguna Creek downstream of Cherry Glen Road, all in the Vaca Mountains east of the City. These projects are anticipated to have extensive environmental impacts, most of which will be detailed as a part of project-specific environmental review. Impacts to be expected include a loss of plant and animal habitat, loss or displacement of plants or animals which live in the habitats of valley woodland, foothill woodland, and riparian areas, altered flows downstream, a change in sedimentation load of the stream, and construction impacts associated with access to canyon sites.

Mitigation: Biotic Resources

Proposed Plan policies state that natural environments should be protected, in recognition of their importance as wildlife habitats and visual amenities and, in particular, call for preservation or replacement of riparian vegetation, minimization of woodland habitat removal, and the provision of wildlife corridors, where feasible, to minimize wildlife-urban conflicts. (See Policy 8.2-I4.) Ridges over 25 percent are to be preserved, and proposed Plan policies propose creek restoration, enhancement, and protection after construction, require appropriate setbacks, and discourage culverting. (See Section 8.1, Creeks and Watershed Protection.) Plan Policy 8.2-G2 provides for the management of remaining Open Space in a manner consistent with wildlife protection. The Vacaville-Solano Irrigation District (SID) Agreement would protect Open Space and Agricultural Lands in the eastern and western portions of the Planning Area.

These proposed Plan policies will reduce the impacts of open space/agricultural land-urban conversion, and project-specific environmental review is anticipated to identify appropriate additional mitigation, for projects ranging from residential development to reservoir siting and installation. Permitting agencies such as the California Department of Fish and Game, the U.S. Fish and Wildlife Service, the Army Corps of Engineers, and public groups such as the California Native Plant Society and Solano County Land Trust and others will review projects and provide comments to the City. As noted above, however, the sheer volume of landscape transformation -- the conversion of 15 percent (or 54 percent of the undeveloped land within the 1980 Planning Area) of the existing Open Space and Agricultural Lands to urban uses -- suggests that the consequent loss of habitat is a significant impact.

Additional suggested mitigation measures include:

- An emphasis on native replacement vegetation, where appropriate; if locally adapted native plants are not readily available, arrangement should be made in advance for a public agency to grow the plants (ESA, *Ulatis Creek Development Area EIR*, January 1990);

- The establishment of on-site or neighborhood habitat preserves and restoration of existing on-site degraded habitat as conditions of project approval;

- Restoration of riparian habitat on a 3:1 ratio (ESA, *Ulatis Creek Development Area EIR*, January 1990);

- Developer-posted performance bonds prior to construction activity, with the performance bonds being used for the cost of the City's remediation if damaging construction-related actions are not corrected (ESA, *Ulatis Creek Development Area EIR*, January 1990);

- Monitoring of potential impacts on environmental resources as a condition of policy plan approval where new development may have an adverse impact on wildlife resources or sensitive habitat.

- Consideration of multi-purpose runoff retention basins which would serve a flood control/drainage function, a wildlife habitat function, a sediment settling pond function, and a biodegradation of fertilizers and pesticides function (ESA, *Ulatis Creek Development Area EIR*, January 1990);

- o Publicizing the unique habitat values of Vacaville by posting appropriate interpretive signs along pathways and at preserves (ESA, *Ulatis Creek Development Area EIR*, January 1990);

- o Implementation of the City's *Creekways Policy Plan*, including inventorying the creeks' plants and animals.

Species of Special Status. Certain species are recognized as needing special protection under State and Federal law, due to their rare, endangered, or threatened status. In addition, some species are under consideration for Federal listing, either as a Candidate 1, or Candidate 2. Candidate 1 species are those not yet listed, but for which the U.S. Fish and Wildlife Service has sufficient biological information to support a proposal for listing the species as Endangered or Threatened. Candidate 2 species are those species which may warrant listing, but for which substantial biological information to support a proposed listing is lacking; when further information is provided by laboratory or field study, the species may be proposed for listing. The U.S. Fish and Wildlife Service recommends that impacts on Candidate Species be considered in an EIR, since the species may become listed during implementation of the Plan.

In addition to Federal and State listings, the California Natural Diversity Data Base (CNDDB) independently evaluates the condition of special plants, animals, and communities listed in their inventory. The CNDDB, run by the Department of Fish and Game, is the most complete single source of information on California's sensitive species and natural communities. Data on these and other elements of natural diversity are provided to the Data Base from a number of sources. The absence of a special plant, animal, or community from the CNDDB does not mean that it is absent from the area in question, only that no occurrence data are currently entered in the inventory. In addition, the occurrence of special species or natural communities in the vicinity of a project may be an indication that they may also occur within the project area. For this reason, this section includes a listing of the presence of such elements or habitats in areas adjacent to the project area. (See Table 4.9-A.) Table 4.9-B is a visual representation of the arrangement and contiguity of USGS Quads, to be used with Table 4.9-A. CNDDB biological staff assigns ranks to each special species inventoried, based on the rarity and taxonomic distinctiveness of the species or community.

Setting: Species of Special Status

According to a March 1990 computer search of the CNDDB, there are no currently listed Federal or State endangered, threatened, or rare species within the Vacaville Planning Area. There are, however, six plants which are

identified as Federal Candidate 2. (See Table 4.9-C.) Of the seven special status species identified within the Planning Area, CNDDB biologists have ranked four of the species as Threatened Statewide and one of the species as Very Threatened Statewide.

Most of these species' locations are identified only generally, although the Contra Costa Goldfields (*Lasthenia conjugens*) was last observed in 1974 in a roadside ditch beside the Southern Pacific railroad tracks several miles southwest of Elmira. Valley Needlegrass Grassland, a special community, was present in the southeastern corner of the Planning Area, along Highway 113, but in 1983 was reported as extirpated at that site.

The species of special status in the vicinity but outside of the Planning Area range in evaluation from a simple recognition of special status as valued species to species rated Endangered (the most severe rating) on both State and Federal levels. These species may also be present but unidentified within the Planning Area. Environmental Science Associates (ESA), in a January 1990 EIR, evaluated the degree of the possibility of some of these species' presence in the Ulatis Creek area. Their findings are summarized in Table 4.9-D.

ESA reports that three special status species not identified by CNDDB as occurring within the Planning Area, may actually be present within the Ulatis Creek Development Area. The presence of riparian trees, such as the Valley Oak, Black Walnut, and Cottonwood indicates that habitat is suitable for Swainson's Hawk for nesting, roosting and forging. Swainson's Hawk, a wide-ranging raptor (a Federal Candidate 2 and State of California Threatened species) has been reported to nest along Putah Creek and may similarly use Ulatis Creek. The Department of Fish and Game notes that the Hawk may be present in the eastern and southern portions of the Planning Area.[6]

The Valley Elderberry Long-horned Beetle (*Desmocerus Californicus dimorphus*) may inhabit Elderberry shrubs along the riparian corridor, and the California Tiger Salamander may live within the Creek area.[7]

The Department of Fish and Game, Region 2, noted in February 1990 that Burrowing Owls (*Athene cunicularia*) and Northern Harriers (*Circus cyaneus*), both species of special concern, may occur within the Planning Area, and should be given consideration to prevent further population declines.

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[6]Dept. of Fish and Game, Region 2, Written Communication, February 27, 1990.

[7]ESA, *Ulatis Creek Development Area EIR*, January 1990; Dept. of Fish and Game, Region 2, Written Communication, February 27, 1990.

TABLE 4.9-A
SPECIES LISTED BY CNDDB, ADJACENT TO THE VACAVILLE PLANNING AREA, MARCH 1990[a]

Common Name	Specific Name	USGS Quads Where Found[b]
Natural Communities:		
Valley Needlegrass Grass Land	--	Dozier
Northern Claypan Vernal Pool	--	Dozier, Fairfield South
Amphibians:		
California Tiger Salamander	*Ambystoma tigrinum californiense*	Dixon, Dozier
Birds:		
Prairie Falcon	*Falco mexicanus*	Mt. George
California Black Rail	*Laterallus jamaicensis coturniculus*	Fairfield South
Western Yellow-Billed Cuckoo	*Coccyzus americanus occidentalis*	Merritt
Short-eared Owl	*Asio flammeus*	Davis
Yellow-Breasted Chat	*Icteria virens*	Mt. Vaca
Tricolored Blackbird	*Agelaius tricolor*	Dozier

Continued

Table 4.9-A -- *Continued*

Common Name	Specific Name	USGS Quads Where Found
Mammals:		
Suisun Shrew	*Sorex ornatus sinuosus*	Fairfield South
Salt Marsh Harvest Mouse	*Reithrodontomys raviventris*	Cordelia
Insects:		
Monarch	*Danaus plexippus*	Fairfield South
Delta Green Ground Beetle	*Elaphrus viridus*	Dozier
Valley Elderberry Longhorn Beetle	*Desmocerus californicus dimorphus*	Monticello Dam, Mt. Vaca
Plants:		
Colusa Grass	*Neostapfia colusana*	Dozier
Crampton's Tuctoria	*Tuctoria mucronata*	Dozier
Adobe Lily	*Fritillaria pluriflora*	Dixon
Fragrant Fritillary	*Fritillaria liliacea*	Dozier
Recurved Larkspur	*Delphinium recurvatum*	Allendale
Mt. Diablo Buckwheat	*Erigonum truncatum*	Fairfield South
Delta Tule Pea	*Lathynus jepsonii* ssp. *jepsonii*	Denverton
Showy Indian Clover	*Trifolium amoenum*	Elmira

Continued

Table 4.9-A -- *Continued*

Common Name	Specific Name	USGS Quads Where Found
Brewer's Dwarf Flax	*Hesperolinon breweri*	Mt. George, Mt. Vaca
Few-Flowered Navarretia	*Navarretia pauciflora*	Capell Valley
Bearded Allocarya	*Plagiobothyrs hystriculus*	Dozier
Soft Bird's Beak	*Cordylanthus mollis* ssp. *mollis*	Fairfield South
Dwarf Downingia	*Downingia humilis*	Dozier, Elmira
Legenere	*Legenere limosa*	Dozier, Fairfield North
Suisun Marsh Aster	*Aster chilensis* var. *lentus*	Dozier, Fairfield South
Contra Costa Goldfields	*Lasthenia conjugens*	Elmira, Fairfield South

Note: [a]The absence of a special animal, plant, or natural community from the California Natural Diversity Data Base does not mean that they are absent from the area in question, only that no occurrence data are currently entered in the Data Base inventory. The occurrence of special species or natural communities in the vicinity may be an indication that they would also occur within the Planning Area.

[b]Refer to Table 4.9-B for a visual representation of the arrangement and contiguity of USGS Quads.

Source: California Natural Diversity Data Base, Department of Fish and Game, March 1990.

TABLE 4.9-B
USGS QUADRANGLES COVERING THE
VACAVILLE PLANNING AREA AND ADJACENT AREAS

		(North)		
Lake Berryessa	Montecito Dam	Winters	Merritt	Davis
Capell Valley	***Mt. Vaca***	***Allendale***	***Dixon***	Saxon
Mt. George	***Fairfield North***	***Elmira***	***Dozier***	Liberty Island
Cordelia	Fairfield South	Denverton	Birds Landing	Rio Vista
		(South)		

Note: Quadrangles which include the Planning Area are included in bold face italics.

TABLE 4.9-C
SPECIES LISTED BY THE CALIFORNIA NATURAL DIVERSITY DATA BASE (CNDDB) WITHIN THE VACAVILLE PLANNING AREA
MARCH 1990

Common Name *Species Name*	USGS Quad	Most Recent Site Observation	Presumption of Onsite Condition	Federal Status	CNDDB Rank[2]
Brewer's Dwarf Flax *Hesperolinon breweri*	Mount Vaca	1892	Extant	Candidate 2[1]	Threatened Statewide
Recurved Larkspur *Delphinium recurvatum*	Allendale	1940	Extant	--	To be determined
Adobe Lily *Fritillaria pluriflora*	Elmira	1913	Extant	Candidate 2	Threatened Statewide
Showy Indian Clover *Trifolium amoenum*	Elmira	1892, 1902, 1909[3]	Extant	Candidate 2	To be determined
Contra Costa Goldfields *Lasthenia conjugens*	Elmira	1974	Extant	Candidate 2	Very threatened Statewide
Bearded Allocarya *Plagiobothrys hystriculus*	Elmira	1883	Extant	Candidate 2	Threatened Statewide
Legenere *Legenere limosa*	Elmira	1983	Extirpated	Candidate 2	Threatened Statewide
Valley Needlegrass Grassland	Dozier	1983	Extirpated	--	To be determined

Notes: [1]Species for which existing information indicates that these species may warrant listing, but for which substantial biological information to support a proposed rule is lacking. None of the species in this table have been listed by the State of California as rare, threatened or endangered.

[2]Ranks are assigned by the CNDDB biological staff and are based primarily on the rarity and taxonomic distinctiveness of the species or community. CNDDB staff uses this ranking method to prioritize species to determine the order in which information is gathered and processed. Ranks are included here as another perspective on species status.

[3]Three sites observed.

TABLE 4.9-D
DEGREE OF POSSIBILITY OF PRESENCE OF
SPECIES OF CONCERN FOR ULATIS CREEK DEVELOPMENT AREA

Plant Species	Degree of Possibility	Rationale
Lasthenia Conjugens Contra Costa Goldfields	Possible	Heavy soil (in places). Moist grassland in Development Area.
Frittillaria pluriflora Adobe Lily	Possible	Clay soil (in places). Hill with surrounding flatland in Development Area.
Delphinium recurvatum Recurved Larkspur	Unlikely	No alkaline flats.
Erigonium Truncatum Mt. Diablo Buckwheat	Unlikely	Considered extinct.
Lathyrus Jepsonii ssp. *jepsonii* Delta Tule Pea	Unlikely	No brackish-water marsh.
Trifolium Amoenum Showy Indian Clover	Possible	Swales in grassland present.
Plagiobothrys hystriculus Bearded Allocarya	Unlikely	No vernal pools in Development Area.

Continued

Table 4.9-D -- *Continued*

Plant Species	Degree of Possibility	Rationale
Cordylanthus mollis ssp. *mollis* Soft Bird's Beak	Unlikely	No coastal salt marsh in Development Area.
Downingia Humilis Dwarf Downingia	Unlikely	No vernal pools in Development Area. May be moist grasslands.
Legenere Limosa Greenes Legenere	Unlikely	No vernal pools in Development Area. May be moist grasslands.
Desmocerus californicus dimorphus Valley Elderberry Longhorn Beetle	Possible	Presence of *Sambucus mexicana* Elderberry in creek.
Ambystoma Tigrinum Californiense California Tiger Salamander	Possible	Closest report was at Concord, Contra Costa County, but habitat correct. Perennial stream in valley and foothill grassland.
Laterallus jamaicensis California Black Rail	Unlikely	No brackish-water marsh in Development Area.
Buteo swainsoni Swainson's Hawk	Possible	Presence of Valley Oak, annual walnut, cottonwood, and willow in riparian corridor.

Source: Environmental Science Associates, Inc. *Ulatis Creek Development Area EIR*, January 1990.

Impacts: Species of Special Status

Contra Costa Goldfields (*Lasthenia conjugens*). The General Plan land use designations for the area where the Contra Costa Goldfields is identified include a Greenbelt Buffer (intended for transitional uses compatible with urban development on one edge and large-scale agriculture on the other), Residential Estate (with a density range of .5 to 3.0 units per gross acre, one of the lowest residential densities specified in the Plan), Public Park, and Agriculture/Open Space. Due to the lack of specificity in the CNDDB records, it is not possible at this time to determine the precise land use designation assigned to the area where the Goldfields was sighted; it is possible that the flowers grow in a strip which crosses several land use designations. It is appropriate to consider the impacts of all four land uses.

The Greenbelt Buffer, Public Park, and Agriculture/Open Space designations could be land uses compatible with the preservation of Contra Costa Goldfields habitat. Residential Estate development would be less likely to easily preserve habitat for the Goldfields; however, their location as described in CNDDB text, in a roadside ditch beside the Southern Pacific Railroad tracks, suggests that land use designations other than Residential Estate development are assigned to Goldfields habitat.

Brewer's Dwarf Flax (*Hesperolinon breweri*). This species is described in the CNDDB as being located generally in Gates Canyon in the Vaca Mountains, in an area designated Open Space. Under the proposed Plan, there is no development permitted on slopes over 25 percent, such as may be found in Gates Canyon. However, an upstream reservoir on Alamo Creek at Gates Canyon is proposed as a part of drainage improvements.

Legenere (*Legenere limosa*). Associated with vernal pools and described in the CNDDB as being located generally in the fields of the Lower Sacramento Valley, near Elmira, Legenere is noted in the Data Base as "Extirpated, this site." The last recorded sighting was in 1890, and established a type location for the species. A field check in 1983 failed to reveal the species, which is not surprising considering the high degree of site disturbance due to agricultural uses. The proposed Plan designates the area for continued agricultural use, and is thus not expected to cause any change in impacts over those which have already occurred. (Legenere is present at the nearby Jepson Prairie Preserve.)

Recurved Larkspur (*Delphinium recurvatum*). These flowers are noted in the CNDDB as occurring in 1940 on clay soil along a roadside (possibly Browns Valley Road) in the north end of Browns Valley. This area is designated by the proposed Plan as Residential Estate, a designation which is not likely to preserve Recurved Larkspur habitat without special attention. However, although the CNDDB specifies

that the species is "presumed extant," its presence was last confirmed 50 years ago. In addition, a note within the Data Base file suggests that the species may have been misidentified at this location.

Additional Species. Because of the general nature of the location of the other plant species' locations (listed as "Vacaville" or "Elmira"), it is not possible to determine the precise impact of the Plan on these species. However, the proposed Plan would allow conversion of open space to urban uses, and this would result in a reduction of available habitat. Urban uses may be expected to increase impervious surfaces, thus changing runoff patterns and altering drainage, and runoff may be expected to contain higher levels of urban-related pollutants. These conditions may affect the species in question.

Species outside of the Planning Area are not likely to be affected directly by implementation of the proposed Plan. Indirect effects may include the general impacts associated with increased urban uses specified above.

As noted above, species identified outside of the Planning Area may also be present, but unidentified, within the Planning Area, given the similarities in habitat. Because it is unknown at this time whether or where these species might be, the land use designations assigned to their potential locations are unknown, and it is impossible to predict the impacts of proposed Plan implementation.

Mitigation: Species of Special Status

Specific project proposals, such as those which might be anticipated to be submitted in the south sector, in the Browns Valley, and as a part of upstream reservoir construction, will be subject to environmental assessment on a project-specific level. These assessments should include site inventory by a qualified consulting biologist to determine the presence or absence of sensitive species, such as the Contra Costa Goldfields, Recurved Larkspur, Brewer's Dwarf Flax, Swainson's Hawk, Burrowing Owl, Northern Harriers, and more. If these special status species are found to be present, appropriate mitigation should be designed, which might include on-site preservation, transplantation, or restoration of habitat elsewhere. The Department of Fish and Game, among others, should be contacted when designing mitigation, particularly in relation to Swainson's Hawk. The discovery of a sensitive animal species within a project area may require the preservation or restoration of habitat, since relocation -- particularly of birds and insects -- may not be possible.

4.10 HISTORIC AND ARCHAEOLOGICAL RESOURCES

Based upon the discovery of a female skeleton during the excavation of a BART tunnel, we know that humans have inhabited the Bay Area for at least 8,000 to 11,000 years. Of these prehistoric inhabitants, the Patwin were the greatest in number and territory in Northern California, controlling the area west of the Sacramento River to the crest of the Coast Range. Before being forcibly baptized and depopulated due to disease and disruption of lifeways, they lived by hunting, fishing, and gathering, and made their homes in semi-permanent villages of 200 to 500 people. At least two such villages seem to have been located in the hills around Vacaville, with one group of people in Lagoon Valley (the Southern Patwin Tribelet, Malacas) and another along Ulatis Creek (the Ululato). The Southern Patwin pre-mission population is estimated at 5,000, giving Solano County "one of the highest population densities in prehistoric America" and making it an area "exceptionally valuable in cultural resources."[1]

The results of a search of the archaeological record attest to this wealth of cultural resources: with only 30 percent of the Planning Area surveyed as of 1990, 26 prehistoric archaeological sites, and 3 archaeological sites containing both historic and prehistoric components have been discovered.[2] These sites are important not only for their abundance, but also their nature, for they include two of the seven oldest sites in California from the period 3,000 BC on, and the only two within the San Francisco Bay Area that are inland rather than on the shore or Delta.

In addition to prehistoric resources, the arrival of Jose Armijo, the Wolfskills, Juan Felipe Peña, and Juan Manuel Vaca in the early 1840's and the subsequent founding and growth of Vacaville have provided many historic structures. The National Register of Historic Places lists the Peña Adobe (also listed on the California Inventory of Historic Resources and California Historic Landmarks), the Will H. Buck House, and the Vacaville Town Hall. The City, in its Historic Resources Inventory, identifies another 195 properties, all

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[1]U.S. Department of Housing and Urban Development, *Proposed Residential Development, 1980-85, Central Solano County Study Area, California, Environmental Impact Report*, July 1979, p. 111-119).

[2]Letter, Vicki Beard, California Archaeological Inventory, Northwest Information Center, April 12, 1990.

protected by the City's Historic Preservation Ordinance which created the Mainstreet Vacaville Historic District and mandates the maintenance of designated buildings and the review of any changes to building exteriors or building demolitions. Besides these resources, there are two primarily historic archaeological sites.

Based on the extent of known prehistoric and historic resources, it is anticipated that additional resources exist within the unsurveyed portions of the Planning Area.

Impacts: Historic and Archaeological Resources

Historical and archaeological resources are offered some protection under State Law if such discoveries are deemed unique. A unique resource, as defined by Section 2183.2 of the Public Resources Code, has the following attributes:

- Contains information needed to answer important scientific research questions and there is demonstrable public interest in the information;
- Has special and particular quality, such as the oldest of its type and the best available of its type; and
- Is directly associated with a scientifically recognized prehistoric or historic person or event.

Only a unique archaeological resource potentially affected by a proposed development qualifies for special protection. Non-unique resources need be given no further consideration beyond recording their existence. Policies 8.5-G1 and 8.5-I2 require the adoption of requirements for the protection of unique archaeological resources. Site records are on file with the City, or at the California Archaeological Inventory. (See Appendix 12, which includes the California Archaeological Inventory Bibliography.)

Further protection of historic resources is offered by the environmental review process.

Mitigation: Historic and Archaeological Resources.

No further mitigation required.

5. Comparison of Alternatives

5.1 POPULATION, JOBS, AND HOUSING

Sketch Plans A, B, and C were analyzed in the first working paper, *Alternative Sketch Plans*, published in July 1989. They did not address development phasing, policies related to annexation, nor different policies on affordable housing programs. Following review by the General Plan Advisory Committee, specific policies and implementation programs were developed for inclusion in the Draft General Plan. The following text summarizes and highlights some of the main points, comparing the Sketch Plans with existing conditions and with buildout of the existing General Plan. Table 5.1-A is a comparison of several of the attributes of the alternatives to the proposed Plan.

Preservation of existing conditions would maintain a household population of 62,950 (estimated for April 1, 1990, based on Department of Finance Estimate for January 1989 and City of Vacaville information), a total of between 13,135 and 17,390 jobs, and a ratio of jobs to employed residents of .56:1.[3] Preservation of existing conditions would involve no average annual growth rate and no new housing construction since everything would remain as it is.

Implementing the existing (1980) General Plan would lead to a household population of 86,874 (January 1989 projection), a total of 54,606 jobs, and a ratio of jobs to employed residents of 1.27:1. The average annual population growth rate would be 1.62 percent, and the average annual growth rate for new housing would be 2.34 percent.

Sketch Plan A, which allowed the highest household population of any of the alternatives, illustrated how developers' proposals outside the current planned urban area would change land use patterns and increase the population and employment base. The employment potential, nearly 72,000 jobs at buildout, was the highest of any of the alternatives, and would result in the highest ratio of jobs to employed residents, at 1.32:1. The rates for average annual population growth and average annual growth for new housing construction were also the highest of any of the alternatives.

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[3]Blayney-Dyett's method of estimating jobs is land and space-based. ABAG uses a different methodology to estimate City employment; their figure of 17,390 includes public sector jobs. The Blayney-Dyett estimate, 13,135 existing jobs, is used in the tables.

TABLE 5.1-A
VACAVILLE PLAN ALTERNATIVES: EXISTING CONDITIONS AND 2010 BUILDOUT

	Existing Conditions	Existing Plan	Sketch Plan A	Sketch Plan B	Sketch Plan C	Proposed Plan
Household Population[d]	62,950[a]	86,874	109,951	104,385	99,418	109,327
Housing Units						
Single Family	13,418	20,809	27,650	25,221	23,498	27,179
Multifamily	5,280	9,597	11,765	11,821	11,633	11,383
Other[b]	2,329	3,007	2,874	3,105	3,107	3,487
Total	21,027	33,413	42,289	40,148	38,238	42,049
Single-Family Share	63.81%	62.28%	65.38%	62.82%	61.45%	64.64%
Average Annual Population Growth Rate, 1990-2010	N/A[e]	1.62%	2.82%	2.56%	2.31%	2.80%
Average Annual Growth Rate for New Housing Construction, 1990-2010	N/A[e]	2.34%	3.56%	3.29%	3.04%	3.53%
Total Potential Jobs[f]	13,135	54,606	71,837	54,207	54,821	60,706
Ratio of Jobs to Employed Residents[c]	.56	1.27	1.32	1.05	1.11	1.12
Residential Development Outside Current Planned Urban Area (Units)	N/A	1,513	9,642	6,565	4,792	8,126
Parks and Greenbelts (Acres)	335	404	1,647	1,975	1,679	845

Notes:
[a]Estimated April 1, 1990, based on Department of Finance estimate for January 1989 and City of Vacaville estimate.
[b]Mobile homes and retirement residential (Leisure Town).
[c]Assumes 0.495 employed residents per household resident.
[d]Assumes 2.6 persons per household.
[e]For growth rates under Existing Conditions, refer to *Existing Conditions and Future Prospects: Planning Issues and Options*, February 1989.
[f]Does not include Public Sector jobs.

5 COMPARISON OF ALTERNATIVES

The California Environmental Quality Act requires the consideration of a range of reasonable alternatives to the proposed Plan. Five alternatives to the proposed Plan are considered in this section: maintenance of existing conditions, the existing (1980) General Plan as built out, and Sketch Plans A, B, and C, as considered in the *Alternative Sketch Plans Working Paper*, published in June 1989.

Maintenance of existing conditions exactly as they are is not a feasible alternative, given planned and unplanned regional changes over which Vacaville residents have little control, and given the current development potential of individual properties as guaranteed by the underlying zoning. However, existing conditions provide a useful baseline from which to measure proposals.

Continued implementation of the existing (1980) Plan without updating the database on which it is founded is not a feasible alternative given changing conditions, and State planning law requirements for cities to update their Housing Elements every five years. Since the writing of the 1980 Plan, enough rapid growth has occurred within the City that a new Plan is required in order to adequately prepare for the future. (See Section 2.3.) As with the "maintenance of existing conditions" alternative, the existing (1980) Plan is also considered as a basis for comparison, rather than as a feasible alternative in its present form.

The other three alternatives are termed Sketch Plans A, B, and C. As a part of the formulation of these potential Plans, development sites were identified where the land was vacant or underutilized. Alternative designations for these sites were developed, and three separate scenarios were projected.

The Sketch Plans show different approaches to setting physical limits of urban development, illustrating various combinations of residential, commercial, and industrial development, alternative locations for golf course residential communities, and a new City park. The mix of components in each Plan was selected to test differences in terms of traffic, housing demand and mix, and environmental impact. Table 5.0-A summarizes the major land use proposals associated with each Sketch Plan.

The population holding capacity is a major difference between the three Sketch Plans. Holding capacity may be reached before or after the projected buildout year 2010, depending on economic conditions, local growth management policies, employment potential, and the location and extent of urban expansion.

TABLE 5.0-A
COMPARISON OF ALTERNATIVE SKETCH PLANS: MAJOR LAND USE PROPOSALS

Land Use	Sketch Plan A	Sketch Plan B	Sketch Plan C
Concept	- Growth emphasis north and west. - Composite of developers' proposals. - Limited use of greenbelt/buffer on eastside.	- More growth east than west. - Open space preserved north of Vaca Valley Rd. and Foothill Dr. - Wider greenbelt/buffer on eastside and north of Vaca Valley Road.	- Focused growth. - Limited extension of services. - Maximum open space. - Greenbelt/buffers closer in than Plan B.
Residential	- Golf course community: Vaca Valley Rd. and along Pleasants Valley Rd. - Residential estate east of Leisure Town Road.	- Golf course residential only in Cherry Glen area. - Estate and low density residential east of Leisure Town Road. - Housing south of city park.	- Low density and estate residential south of Alamo Drive. - No residential east of Leisure Town Road (exception: some clusters). - More housing on Allison south of I-80.
Commercial/ Industrial	- Major retail expansion. - Visitor commercial and office at "Basic" site. - Mixed use development in Lagoon Valley. - Large-scale mixed use east of I-505.	- Moderate retail expansion. - Retail and visitor commercial at "Basic" site. - Industrial park and private recreation in Lagoon Valley. - Limited industrial east of I-505.	- Moderate retail expansion. - Retail at "Basic" site. - Industrial park on City land at Browns Valley Parkway. - Limited mixed use development east of I-505.
Parks/ Open Space	- City park at Brown's Valley Rd. - 3 new community parks. - 9 new neighborhood parks.	- "Muni Links" north of Allison Dr. - City park on Allison south of I-80. - 3 new community parks. - 4 new neighborhood parks.	- No city park. - 3 new community parks. - 3 new neighborhood parks.
Circulation	- Southern Loop. - Foxboro-Ulatis Link. - North Alamo Drive Extension.	- Southern Loop. - Foxboro-Willow Avenue Link. - North Alamo Drive Extension with "T" intersection at Vaca Valley Rd.	- No Southern Loop. - Foxboro-Leisure Town Road Link. - No North Alamo Drive Extension.

Sketch Plans A, B, and C were analyzed in the first working paper, A significant proportion of the new housing in Sketch Plan A would be built outside the current planned urban area, most of this in the West Valley planning sectors. Limited urban expansion is shown east of Leisure Town Road, where a greenbelt/buffer intended to prevent conflict between urban land uses and agriculture is proposed beyond a band of residential estate development.

Sketch Plan B illustrated urban expansion in the West Valley planning sectors south of Vaca Valley Road. Residential development is shown east of Leisure Town Road and in the South Sector east of Foxboro. The intensity of development is modestly reduced from Plan A, and more park and greenbelt acres are provided than in any of the other alternatives; however, the number of acres proposed as open space is the lowest among the alternatives.

With a projected household population of around 104,400 at buildout, this Plan falls between Sketch Plans A and C in terms of population, but, with the exception of the maintenance of existing conditions, provides the least potential jobs of any alternative.

Sketch Plan C emphasized infill development, with higher density residential development near downtown and in the Allison Business Park. The average annual growth rate for new housing construction is the lowest of the Sketch Plans, at 3.04 percent, but higher than the 2.34% projected under the existing General Plan. Similarly, the average annual population growth rate is the lowest of the three Sketch Plans, although not as low as the Existing Plan. Outside of maintaining existing conditions, Plan C preserves the most open space of any of the alternatives, and more than the proposed Plan. (See Table 5.3-A.)

Jobs and Jobs/Housing Balance. Of the alternatives, Plan A provided the most potential employment, approximately 72,000 jobs, based solely on acres designated for industrial and commercial development (See Table 5.1-B). The very high number of jobs that could be generated under this Plan is due to the large amount of land which would be designated for commercial and industrial development. Plan B would provide more of a mixed employment base, with less industrial development in the I-505 corridor. Plan C would emphasize new employment over expansion in existing industrial and business parks, and adds the most potential retail shopping and commercial services. Plan B provided the best "match" of jobs to employed residents (1.05:1).

TABLE 5.1-B
VACAVILLE PROPOSED PLAN AND ALTERNATIVES: POTENTIAL EMPLOYMENT

	Jobs[a]	Percent Change From Existing Conditions	Percent Change from Existing Plan	Percent Commercial Jobs	Percent Industrial[b] Jobs
Existing Conditions:	13,135	N/A	N/A	54%	46%
Existing Plan:	54,606	316%	N/A	47%	53%
Plan A:[c]	71,837	447%	+32%	33%	67%
Plan B:[c]	54,207	313%	-1%	38%	62%
Plan C:[c]	54,821	317%	≤+1%	42%	58%
Proposed Plan:	60,706	362%	+12%	43%	57%

Note: [a]Does not include public sector jobs.

[b]Industrial Jobs category includes office employment, to distinguish this category from Commercial Jobs, which represents the retail sector.

[c]Sketch Plan figures are based on April 1990 land use tables.

5.2 THE URBAN ENVIRONMENT

Traffic

As modeled by TJKM Traffic Consultants, implementation of any Sketch Plan would, on average, increase volumes over those projected for buildout of the existing (1980) General Plan, and would increase volumes well above existing conditions. For each of the Sketch Plans, traffic flow on arterials from south Vacaville to north Vacaville would experience the highest increases, impacting most heavily Nut Tree Road and Leisure Town Toad. East-west streets would have significant traffic increases, but not as high as those projected for north-south streets. All interchanges between Alamo Drive to Leisure Town Road on I-80 and the Vaca Valley Road/I-505 interchange are projected to require major improvements to accommodate future traffic volumes. All of the Sketch Plans, the existing (1980) Plan, and the proposed (1990) Plan would add to the heavy traffic volumes projected for I-80 through Vacaville. The existing (1980) Plan and Sketch Plans B and C would generate less traffic than the Proposed Plan. Sketch Plan A would generate more traffic than the Proposed Plan primarily because of the higher employment base.

Air Quality

As modeled under the California Air Resources Board URBEMIS2 model, by 2010 Vacaville Air Quality is expected to worsen under all of the alternatives except for the maintenance of existing conditions. The model measures levels of Total Organic Gases (TOG), Carbon Monoxide (CO), and Nitrogen Oxides (NO_X). URBEMIS2 assumes a gradual improvement in auto emissions, as older vehicles with higher emissions levels are retired, and as the "fleet" becomes cleaner; thus, the situation where Existing Conditions are projected to 2010 produces less emissions than the Existing Conditions today (1990). Sketch Plan A produces the most emissions, and Sketch Plan C the least, excluding the maintenance of existing conditions. (See Table 5.2-A.)

Noise

Noise levels are expected to increase under all of the Sketch Plans, under the existing (1980) General Plan and the proposed (1990) General Plan. Even with the maintenance of land uses under the existing conditions option, noise levels would be expected to increase due to regional increases in traffic along the I-80 corridor. Future noise levels were not quantified for the Sketch Plans or for the existing (1980) General Plan.

Vacaville Air Quality: Existing and 2010

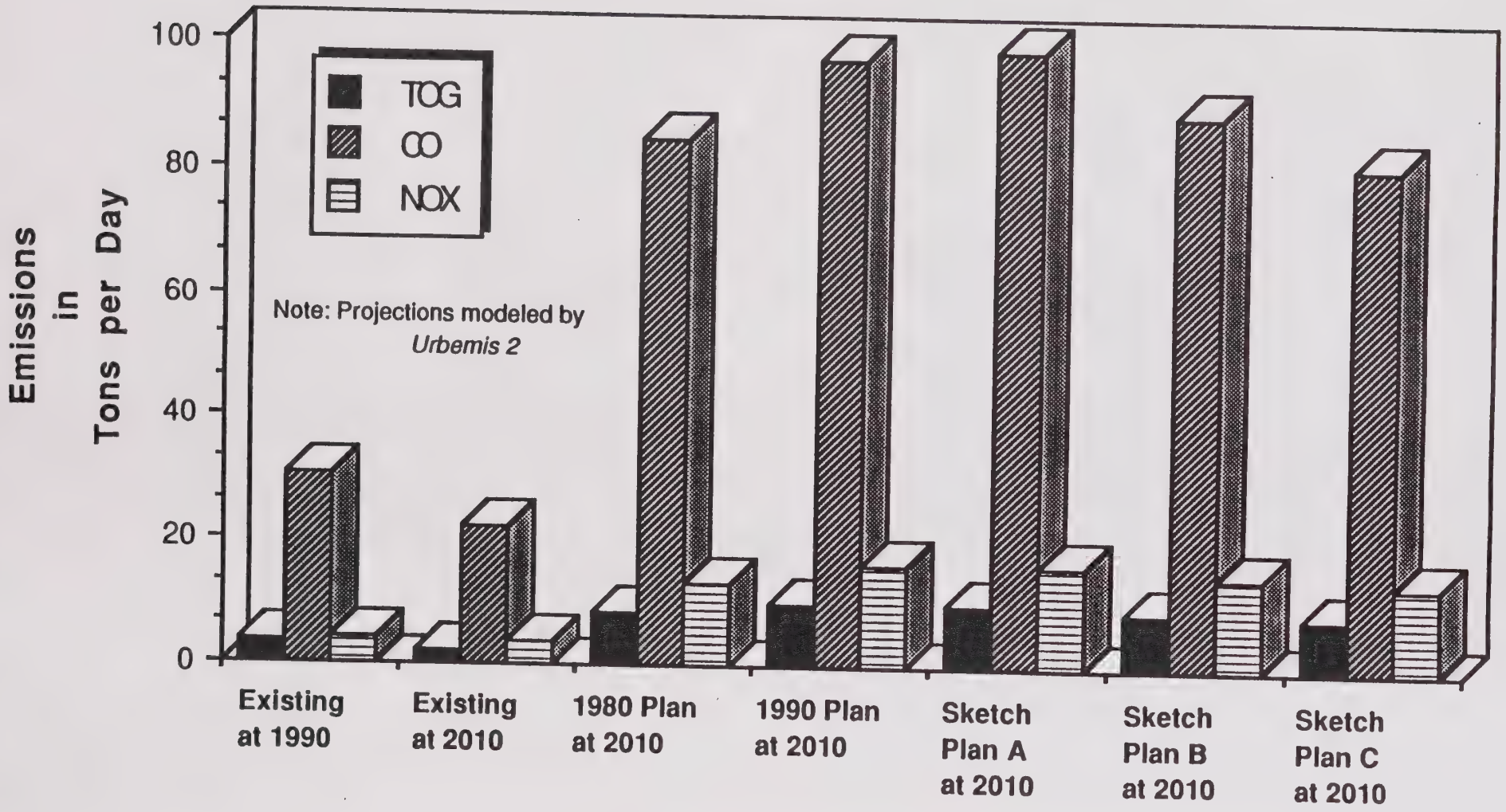


Table 5.2-A

Visual Quality/Community Image

The Plan alternatives would affect the image of Vacaville, both as it would appear to community residents and others. Under existing conditions, the 1980 General Plan, and Plan C, the urban edge would be more tightly defined than under the Proposed Plan or under Sketch Plans A and B. However, the Proposed Plan makes specific commitments to urban separators, greenbelt, or transition zones between agriculture and open space and to urban open space, all of which would enhance the overall community image.

Community Services: Schools

Buildout under the Sketch Plans and under the proposed Plan will lead to a need for more schools than would be required under the maintenance of existing conditions and under the existing (1980) General Plan.

Community Services: Parks and Recreation

All three Sketch Plans include new community parks at the periphery: at Laguna Creek, Vaca Valley, and the intersection of Elmira and Leisure Town roads. Sketch Plans A and B also show different locations for a city park, which would not be developed under Plan C. Both Plan A and B would exceed the target "standard" for parkland of five acres per thousand residents, while Plan C would allocate only 3.9 park acres per thousand residents. The maintenance of existing conditions would maintain a ratio of 5 acres per thousand residents, whereas buildout under the existing (1980) Plan would lead to a ratio of 4 acres per thousand residents, which is existing policy.

Community Services: Water Supply and Distribution

As analyzed by Nolte and Associates, Engineers, each of the alternative Sketch Plans would result in substantial increases in buildout water demands over the existing (1980) General Plan, and a much greater demand than exists currently. As explained in *Alternative Sketch Plans*, the cost for new water facilities would be highest under Sketch Plan B, although demand would be highest under Sketch Plan A. (No facility cost estimates have been prepared for the proposed Plan.)

Community Services: Wastewater Collection and Treatment

According to analysis performed by Brown and Caldwell, Engineers, future wastewater flows projected for the Sketch Plans would be greatest under Sketch Plan A and least under Sketch Plan C. These projections would be greater than existing wastewater flows, and flows anticipated under buildout of the

existing (1980) General Plan. (Specific flow estimates for the proposed Plan will be prepared in the Sewer Master Plan Update.) All of the Sketch Plans and the proposed Plan will require improvements such as replacement sewers and installation of relief sewers.

TABLE 5.2-B
SOLID WASTE GENERATION AND LANDFILL CAPACITY REQUIRED

	Household Population	Solid Waste Generated (tons per year)	Capacity Required Required by 2005 (in cubic yards)
Existing Conditions	62,950	74,000	2.0 million
1980 Plan Buildout	86,874	104,600	2.8 million
Sketch Plan A	109,951	132,400	3.6 million
Sketch Plan B	104,385	125,700	3.4 million
Sketch Plan C	99,418	119,700	3.2 million
Proposed Plan	109,000	130,000	3.5 million

Source: Based on *Solano County Solid Waste Management Plan Revision*, 1988.

Community Services: Solid Waste

The maintenance of existing conditions would generate the least amount of solid waste, at about 74,000 tons per year, requiring 2.0 million cubic yards of required landfill capacity by 2005. Sketch Plan A would generate the most solid waste, with 132,400 tons per year and a need for 3.6 million cubic yards required by 2005. The proposed Plan generates slightly less, with about 130,000 tons of solid waste generated per year, and a corresponding need for 3.5 million cubic yards required landfill capacity. (See Table 5.2-B.)

TABLE 5.2-C
FIRE PROTECTION

	Household Population	Total Fire Suppression and Rescue Personnel Required by 2010	Additional Personnel Needed[a]
Existing Conditions	62,950	44	0
1980 Plan Buildout	86,874	61	17
Sketch Plan A	109,951	77	33
Sketch Plan B	104,385	73	29
Sketch Plan C	99,418	70	26
Proposed Plan	109,000	76	32

Note: [a]To maintain the existing ratio of 0.7 fire suppression and rescue personnel per 1,000 population.

Community Services: Fire Protection

Based on population projections, Sketch Plan A is expected to require the greatest number of fire suppression and rescue personnel, closely followed by the proposed Plan. (See Table 5.2-C.) All of the Plans avoid development in very high hazard areas. However, Sketch Plan A would place more development adjacent to very high and extreme hazard areas with urbanization of West Valleys, North and Vaca Valley.

TABLE 5.2-D
POLICE PROTECTION

	Household Population	Sworn Officers Required by 2010	Additional Sworn Officers Required[a]
Existing Conditions	62,950	69	0
1980 Plan Buildout	86,874	96	27
Sketch Plan A	109,951	121	52
Sketch Plan B	104,385	115	46
Sketch Plan C	99,418	109	40
Proposed Plan	109,000	120	51

Note: [a]To maintain the existing ratio of 1.1 sworn officers per 1,000 population.

Community Services: Police Protection

Based on population projections, Sketch Plan A would require the greatest number of sworn officers in Vacaville, closely followed by the proposed Plan. (See Table 5.2-D.)

5.3 AGRICULTURAL, ENVIRONMENTAL, AND HISTORIC FACTORS

Open Space and Agricultural Land

In Vacaville, the major open space areas that conform to the open space categories identified in State Law are in the agricultural areas in the West Valleys and east of Leisure Town Road, in the English Hills and the hillsides around Lagoon Valley and along the creeks. Table 5.3-A shows that the alternatives designate a significant portion of these areas as open space. Aside from the maintenance of existing conditions, Sketch Plan C converts the least amount of open space and agricultural lands to urban uses, and Sketch Plan B converts the most land.

TABLE 5.3-A
VACAVILLE PROPOSED PLAN AND ALTERNATIVES: OPEN SPACE

	Acres Proposed as Open Space[a]	Acres Proposed as Open Space, All Sectors
Existing Conditions:	12,297	45,341
Existing Plan:	7,819	7,819[b]
Plan A:	8,230	41,274
Plan B:	5,023	38,067
Plan C:	11,391	44,435
Proposed Plan:	5,638	38,682

Note: [a]The first column does not include the three Planning Sectors of Vaca Mountain Foothills, East of Elmira, and the Central Sector. When the Sketch Plan Alternatives were considered, the Planning Area did not include these three additional sectors; they are included in the second column for comparative purposes. Inclusion of this acreage raises totals in each category (excepting the Existing Plan) by 33,044 acres.

[b]The Existing Plan did not include consideration of two Planning Sectors: Vaca Mountain Foothills and East of Elmira.

Geologic and Soils Hazards

All of the alternatives and the proposed Plan would locate development away from unstable areas and steep slopes, and would require site-specific geologic studies prior to development.

Hydrology: Drainage and Water Quality

According to analysis performed by Camp Dresser and McKee, Inc., of the three alternative Sketch Plans, Sketch Plan C would have the least impact with respect to drainage considerations, and Sketch Plan A would have the greatest impact, both in regard to percent increase in runoff and in incremental cost increases.

Biotic Resources

Because of the assumed habitat value of open space and agricultural land, biotic resources are projected to be most heavily impacted by Sketch Plan B, which converts the most open space and agricultural land to urban uses. Aside from the maintenance of existing conditions, Sketch Plan C converts the least amount of open space and agricultural land to urban uses.

Historic and Archaeologic Resources

All of the alternative Sketch Plans, the existing Plan, and the proposed Plan provide for the preservation of historic and archaeologic resources.

6. *Impact Overview*

6 IMPACT OVERVIEW

6.1 GROWTH-INDUCING IMPACTS

The proposed General Plan would allow additional residential, commercial and industrial development over and above that which exists in the Vacaville Planning Area as well as more residential and commercial development than would be allowed under the 1980 Plan. Furthermore, proposed infrastructure improvements in the hillsides will induce growth in this area. The proposed Plan would allow less industrial development than would the existing General Plan.

The additional housing in the proposed General Plan may be regarded as growth-inducing. However, the environmental consequences of not providing housing near Bay Area employment centers (longer commutes, more auto trips, more air pollution) would be significant and adverse, and the proposed Plan, due to urban limit lines, policies on extension of water service, and higher densities, would conserve open land and provide more affordable housing.

The Solano Irrigation District and the City are considering an agreement to limit urban expansion in the agricultural areas, which would reduce the growth-inducing impact of the Plan. (See Appendix 3.) However, increased sewer and water services will be necessary under any development scenario by 2000.

6.2 SHORT-TERM USES vs. LONG-TERM PRODUCTIVITY OF THE ENVIRONMENT

The cumulative long-term adverse impacts of the proposed project are relative decline in air and water quality, increases in traffic-related noise, and loss of habitat. The project sponsor (City of Vacaville) believes the project is justified now because the continuation of the policies of the existing General Plan or the maintenance of existing conditions would perpetuate an imbalance between housing and industrial land needs. More open space would be preserved under the proposed Plan than under the existing General Plan.[4]

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[4]This is true because the existing General Plan does not include the open space and agricultural lands in the Planning Sectors of the Vaca Mountain Foothills and East of Elmira sectors. Without these sectors, the existing Plan preserves more open space than the proposed Plan. See Table 5.3-A.

6.3 SIGNIFICANT UNAVOIDABLE ENVIRONMENTAL CHANGES

Significant unavoidable environmental changes judged to result from development under the proposed Plan are related to traffic, air quality, noise, water supply, and sewer system capacity. Development under the Plan would also result in the loss of open space and habitat, with consequent impacts on biotic resources, and a loss of agricultural lands.

6.4 CUMULATIVE IMPACTS

Based on ABAG projections for the period between 1990 and 2010[5], Solano County will experience an increase of 68 percent in jobs and 54 percent in the number of households. These development trends will have significant adverse environmental impacts that would include: congested highways and arterials, and resulting effects on air quality and energy consumption, and intense pressure to develop all buildable sites, thus causing loss of grazing land, wildlife habitat and loss of open space in the Vacaville Planning Area. The feasible mitigation for some of these impacts would be development in accord with general plans that balance jobs and housing development (minimizing commuting on a regional scale), provide affordable housing and a variety of employment opportunities, and preserve open space and agricultural lands. The proposed Plan has been designed accordingly, as has been described above.

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[5]ABAG *Projections '90* projects through 2005. Additional projections were done by Blayney-Dyett.

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8 LIST OF CONTACTS

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Appendices

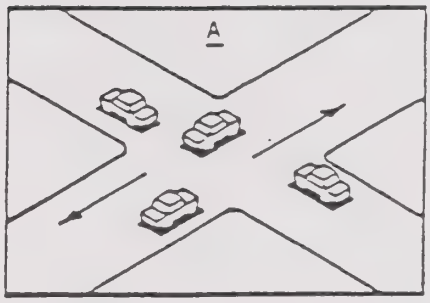
Appendix 1

Level of Service Definitions

APPENDIX 1

LEVEL OF SERVICE A *Volume/Capacity Ratio= 0 - 0.59*

- Free flow conditions
- No vehicle waits longer than one signal indication

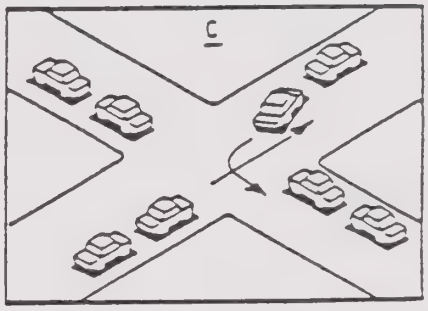


LEVEL OF SERVICE B *Volume/Capacity Ratio=0.60 - 0.69*

- Stable traffic flow
- Motorists rarely wait through more than one signal indication

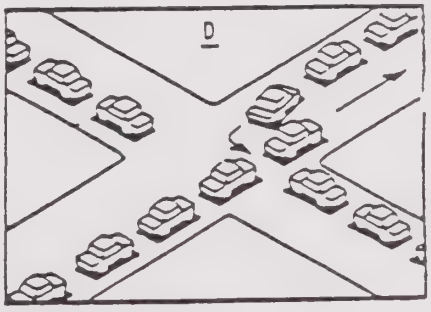
LEVEL OF SERVICE C *Volume/Capacity Ratio=0.70 - 0.79*

- Stable and acceptable flow but speed and maneuverability somewhat restricted due to higher volumes
- Motorists intermittently wait through more than one signal indication
- Occasional backups behind left turning vehicles



LEVEL OF SERVICE D *Volume/Capacity Ratio=0.80 - 0.89*

- Extensive delays at times
- Some motorists, especially left turners, may wait through one or more signal indications, but enough cycles with lower demand occur to prevent excessive backups
- Maneuverability restricted

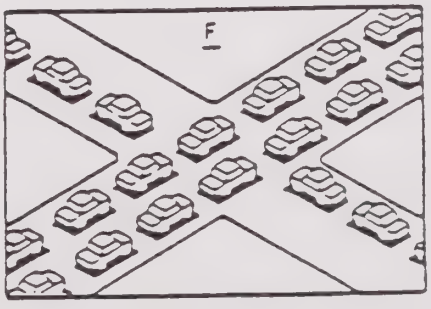


LEVEL OF SERVICE E *Volume/Capacity Ratio=0.90 - 0.99*

- Very long queues may create lengthy delays, especially for left turning vehicles
- Volume at or near capacity
- Unstable flow

LEVEL OF SERVICE F *Volume/Capacity Ratio=1.00 or greater*

- Backups from locations downstream restrict movement at intersection approaches
- Forced flow conditions
- Stoppage for long periods due to congestion
- Volumes drop to zero in extreme cases



WILBUR SMITH AND ASSOCIATES

LEVEL OF SERVICE DEFINITIONS

Appendix 2

URBEMIS2
Air Quality Model Runs

Project Name: Vacaville Proposed Plan (Projected to 2010) Date: 03-30-90

Analysis Year = 2010 Temperature = 70
EMFAC7 VERSION : EMFAC7C ... 1/4/87

Unit Type	Trip Rate	Size	Tot Trips	Days Op.
Rural Residential	10.0/Unit	60	600	
Residential Estate	10.0/Unit	4544	45440	
Residential Low Density	10.0/Unit	21764	217640	
Residential Low Med. Density	10.0/Unit	811	8110	
Residential Medium Density	10.0/Unit	3949	39490	
Residential High Density	5.4/Unit	6734	36364	
Res. Very High Density	3.7/Unit	700	2590	
Mobile Home	5.4/Unit	1772	9569	
Retirement Community	3.3/Unit	1715	5660	
Downtown	481.3/Acre	44	21273	1
Highway Commercial	1230.0/Acre	687	844641	1
Commercial Strip Business	359.1/Acre	107	38244	1
Office	308.0/Acre	282	86733	1
Industrial Park	276.6/Acre	1404	388263	1
Public	776.0/Acre	483	374575	1
Industrial General	52.4/Acre	42	2211	1
Retail Shopping	616.0/Acre	773	475860	1

	Residential			Commercial	
	Home-Work	Home-Shop	Home-Other	Work	Non-Work
Trip Length	6.0	2.6	3.4	5.4	3.5
% Started Cold	88.6	40.4	58.8	77.8	27.6
Trip Speed	35	35	35	35	35
Percent Trip	27.3	21.2	51.5		

Vehicle Fleetmix

Vehicle Type	Percent Type	Leaded	Unleaded	Diesel
Light Duty Autos	72.8	1.5	95.9	2.6
Light Duty Trucks	14.3	2.4	94.9	2.8
Medium Duty Trucks	4.3	5.9	94.2	0.0
Heavy Duty Trucks	3.9	33.3	66.7	N/A
Heavy Duty Trucks	3.9	N/A	N/A	100.0
Motorcycles	0.9	100.0	N/A	N/A

Project Emissions Report in Ton/Day

Unit Type	TOG	CO	NOX
Rural Residential	0.0	0.0	0.0
Residential Estate	0.2	2.2	0.3
Residential Low Density	1.0	10.4	1.5
Residential Low Med. Density	0.0	0.4	0.1
Residential Medium Density	0.2	1.9	0.3
Residential High Density	0.2	1.7	0.2
Res. Very High Density	0.0	0.1	0.0
Mobile Home	0.0	0.5	0.1
Retirement Community	0.0	0.3	0.0
Downtown	0.1	0.7	0.1
Highway Commercial	3.0	27.9	5.1
Commercial Strip Business	0.1	1.3	0.2
Office	0.4	3.7	0.6
Industrial Park	1.8	17.8	2.8
Public	1.4	12.9	2.3
Industrial General	0.0	0.1	0.0
Retail Shopping	1.7	15.7	2.9
Total	10.10	97.60	16.5

ProjectName: Vacaville Existing Conditions Date: 03-29-90

Analysis Year = 1990 Temperature = 70
EMFAC7 VERSION : EMFAC7C ... 1/4/87

Unit Type	Trip Rate	Size	Tot Trips	Days Op.
Rural Residential	10.0/Unit	0	0	
Residential Estate	10.0/Unit	570	5700	
Res. Low Density	10.0/Unit	12085	120850	
Res. Med. Low Density	10.0/Unit	815	8150	
Res. Medium Density	10.0/Unit	1444	14440	
Residential High Density	5.4/Unit	3836	20714	
Res. Very High Density	3.7/Unit	0	0	
Mobile Home	5.4/Unit	1221	6593	
Retirement Community	3.3/Unit	1108	3656	
Downtown	481.3/Acre	28	13428	1
Retail Shopping	616.0/Acre	180	110757	1
Highway Commercial	1230.0/Acre	78	95571	1
Commercial Strip Business	359.1/Acre	96	34438	1
Office	308.0/Acre	26	8070	1
Industrial Park	276.6/Acre	281	77697	1
Public	776.0/Acre	33	25375	1
Industrial General	52.4/Acre	32	1666	1

	Residential			Commercial	
	Home-Work	Home-Shop	Home-Other	Work	Non-Work
Trip Length	6.0	2.6	3.4	5.4	3.5
% Started Cold	87.7	38.4	57.0	76.6	26.6
Trip Speed	35	35	35	35	35
Percent Trip	27.3	21.2	51.5		

Vehicle Fleetmix

Vehicle Type	Percent Type	Leaded	Unleaded	Diesel
Light Duty Autos	72.8	1.5	95.9	2.6
Light Duty Trucks	14.3	2.4	94.9	2.8
Medium Duty Trucks	4.3	5.9	94.2	0.0
Heavy Duty Trucks	3.9	33.3	66.7	N/A
Heavy Duty Trucks	3.9	N/A	N/A	100.0
Motorcycles	0.9	100.0	N/A	N/A

Project Emissions Report in Ton/Day

Unit Type	TOG	CO	NOX
Rural Residential	0.0	0.0	0.0
Residential Estate	0.0	0.4	0.0
Res. Low Density	0.3	8.1	1.0
Res. Med. Low Density	0.1	0.5	0.1
Res. Medium Density	0.1	1.0	0.1
Residential High Density	0.2	1.4	0.2
Res. Very High Density	0.0	0.0	0.0
Mobile Home	0.1	0.4	0.1
Retirement Community	0.0	0.2	0.0
Downtown	0.1	0.6	0.1
Retail Shopping	0.6	5.0	0.8
Highway Commercial	0.5	4.4	0.7
Commercial Strip Business	0.2	1.7	0.3
Office	0.1	0.5	0.1
Industrial Park	0.6	5.0	0.7
Public	0.1	1.2	0.2
Industrial General	0.0	0.1	0.0
Total	3.6	30.50	4.40

Project Name: Vacaville Existing Condit (Projected to 2010) Date: 04-01-90

Analysis Year = 2010 Temperature = 70
EMFAC7 VERSION : EMFAC7C ... 1/4/87

Unit Type	Trip Rate	Size	Tot Trips	Days Op.
Rural Residential	10.0/Unit	0	0	
Residential Estate	10.0/Unit	570	5700	
Residential Low Density	10.0/Unit	12085	120850	
Res. Medium Low Density	10.0/Unit	815	8150	
Residential Medium Density	10.0/Unit	1444	14440	
Residential high Density	5.4/Unit	3836	20714	
Res. Very High Density	3.7/Unit	0	0	
Mobile Home	5.4/Unit	1221	6593	
Retirement Community	3.3/Unit	1108	3656	
Downtown	481.3/Acre	28	13476	1
Retail Shopping	616.0/Acre	180	110880	1
Highway Commercial	1230.0/Acre	78	95940	1
Commercial Strip Business	359.1/Acre	96	34474	1
Office	308.0/Acre	26	8008	1
Industrial Park	276.6/Acre	281	77725	1
Public	776.0/Acre	33	25608	1
Industrial General	52.4/Acre	32	1677	1

	Residential			Commercial	
	Home-Work	Home-Shop	Home-Other	Work	Non-Work
Trip Length	6.0	2.6	3.4	5.4	3.5
% Started Cold	88.6	40.4	58.8	77.8	27.6
Trip Speed	35	35	35	35	35
Percent Trip	27.3	21.2	51.5		

Vehicle Fleetmix

Vehicle Type	Percent Type	Leaded	Unleaded	Diesel
Light Duty Autos	72.8	1.5	95.9	2.6
Light Duty Trucks	14.3	2.4	94.9	2.8
Medium Duty Trucks	4.3	5.9	94.2	0.0
Heavy Duty Trucks	3.9	33.3	66.7	N/A
Heavy Duty Trucks	3.9	N/A	N/A	100.0
Motorcycles	0.9	100.0	N/A	N/A

Project Emissions Report in Ton/Day

Unit Type	TOG	CO	NOX
Rural Residential	0.0	0.0	0.0
Residential Estate	0.0	0.3	0.0
Residential Low Density	0.6	5.8	0.8
Res. Medium Low Density	0.0	0.4	0.1
Residential Medium Density	0.1	0.7	0.1
Residential high Density	0.1	1.0	0.1
Res. Very High Density	0.0	0.0	0.0
Mobile Home	0.0	0.3	0.0
Retirement Community	0.0	0.2	0.0
Downtown	0.0	0.4	0.1
Retail Shopping	0.4	3.7	0.7
Highway Commercial	0.3	3.2	0.6
Commercial Strip Business	0.1	1.2	0.2
Office	0.0	0.3	0.1
Industrial Park	0.4	3.6	0.6
Public	0.1	0.9	0.2
Industrial General	0.0	0.1	0.0
Total	2.1	22.1	3.6

Project Name: Vacaville Existing Plan At Buildout (Projected to 2010) Date: 03-30-90

Analysis Year = 2010 Temperature = 70
EMFAC7 VERSION : EMFAC7C ... 1/4/87

Unit Type	Trip Rate	Size	Tot Trips	Days Op.
Rural Residential	10.0/Unit	0	0	
Residential Estate	10.0/Unit	1655	16550	
Residential Low Density	10.0/Unit	18645	186450	
Residential Low Med. Density	10.0/Unit	507	5070	
Residential Medium Density	10.0/Unit	3641	36410	
Residential High Density	5.4/Unit	5956	32162	
Res. Very High Density	3.7/Unit	0	0	
Mobile Home	5.4/Unit	1292	6977	
Retirement Community	3.3/Unit	1715	5660	
Downtown	481.3/Acre	42	20311	1
Highway Commercial	1230.0/Acre	515	633204	1
Commercial Strip Business	353.1/Acre	151	54296	1
Office	308.0/Acre	346	106599	1
Industrial Park	276.6/Acre	1182	326831	1
Public	776.0/Acre	194	150156	1
Industrial General	52.4/Acre	256	13409	1
Retail Shopping	616.0/Acre	811	499699	1

	Residential			Commercial	
	Home-Work	Home-Shop	Home-Other	Work	Non-Work
Trip Length	6.0	2.6	3.4	5.4	3.5
% Started Cold	88.6	40.4	58.8	77.8	27.6
Trip Speed	35	35	35	35	35
Percent Trip	27.3	21.2	51.5		

Vehicle Fleetmix

Vehicle Type	Percent Type	Leaded	Unleaded	Diesel
Light Duty Autos	72.8	1.5	95.9	2.6
Light Duty Trucks	14.3	2.4	94.9	2.8
Medium Duty Trucks	4.3	5.9	94.2	0.0
Heavy Duty Trucks	3.9	33.3	66.7	N/A
Heavy Duty Trucks	3.9	N/A	N/A	100.0
Motorcycles	0.9	100.0	N/A	N/A

Project Emissions Report in Ton/Day

Unit Type	TOG	CO	NOX
Rural Residential	0.0	0.0	0.0
Residential Estate	0.1	0.8	0.1
Residential Low Density	0.9	8.9	1.2
Residential Low Med. Density	0.0	0.2	0.0
Residential Medium Density	0.2	1.7	0.2
Residential High Density	0.2	1.5	0.2
Res. Very High Density	0.0	0.0	0.0
Mobile Home	0.0	0.3	0.0
Retirement Community	0.0	0.3	0.0
Downtown	0.1	0.7	0.1
Highway Commercial	2.3	20.9	3.8
Commercial Strip Business	0.2	1.9	0.3
Office	0.5	4.5	0.7
Industrial Park	1.5	15.0	2.4
Public	0.6	5.2	0.9
Industrial General	0.1	0.6	0.1
Retail Shopping	1.8	16.5	3.0
Total	**8.5**	**84.40**	**13.0**

Project Name: Vacaville Sketch Plan A Date: 04-03-90

Analysis Year = 2010 Temperature = 70
EMFAC7 VERSION : EMFAC7C ... 1/4/87

Unit Type	Trip Rate	Size	Tot Trips	Days Op.
Rural Residential	10.0/Unit	628	6280	
Residential Estate	10.0/Unit	5236	52360	
Residential Low Density	10.0/Unit	20067	200670	
Res. Medium Low Density	10.0/Unit	1719	17190	
Residential Medium Density	10.0/Unit	6448	64480	
Residential High Density	5.4/Unit	5238	28285	
Res. Very High Density	3.7/Unit	78	289	
Mobile Home	5.4/Unit	1159	6259	
Retirement Community	3.3/Unit	1715	5660	
Downtown	481.3/Acre	41	19878	1
Retail Shopping	616.0/Acre	747	459906	1
Highway Commercial	1230.0/Acre	532	654360	1
Commercial Strip Business	359.1/Acre	90	32319	1
Office	308.0/Acre	288	88581	1
Industrial Park	276.6/Acre	1998	552757	1
Public	776.0/Acre	461	357658	1
Industrial General	52.4/Acre	364	19068	1

	Residential			Commercial	
	Home-Work	Home-Shop	Home-Other	Work	Non-Work
Trip Length	6.0	2.6	3.4	5.4	3.5
% Started Cold	88.6	40.4	58.8	77.8	27.6
Trip Speed	35	35	35	35	35
Percent Trip	27.3	21.2	51.5		

Vehicle Fleetmix

Vehicle Type	Percent Type	Leaded	Unleaded	Diesel
Light Duty Autos	72.8	1.5	95.9	2.6
Light Duty Trucks	14.3	2.4	94.9	2.8
Medium Duty Trucks	4.3	5.9	94.2	0.0
Heavy Duty Trucks	3.9	33.3	66.7	N/A
Heavy Duty Trucks	3.9	N/A	N/A	100.0
Motorcycles	0.9	100.0	N/A	N/A

Project Emissions Report in Ton/Day

Unit Type	TOG	CO	NOX
Rural Residential	0.0	0.3	0.0
Residential Estate	0.2	2.5	0.3
Residential Low Density	1.0	9.6	1.3
Res. Medium Low Density	0.1	0.8	0.1
Residential Medium Density	0.3	3.1	0.4
Residential High Density	0.1	1.4	0.2
Res. Very High Density	0.0	0.0	0.0
Mobile Home	0.0	0.3	0.0
Retirement Community	0.0	0.3	0.0
Downtown	0.1	0.7	0.1
Retail Shopping	1.6	15.2	2.8
Highway Commercial	2.3	21.6	3.9
Commercial Strip Business	0.1	1.1	0.2
Office	0.4	3.7	0.6
Industrial Park	2.6	25.4	4.0
Public	1.3	12.3	2.2
Industrial General	0.1	0.9	0.1
Total	**10.20**	**99.20**	**16.20**

Project Name: Vacaville Sketch Plan B Date: 04-03-90

Analysis Year = 2010 Temperature = 70
EMFAC7 VERSION : EMFAC7C ... 1/4/87

Unit Type	Trip Rate	Size	Tot Trips	Days Op.
Rural Residential	10.0/Unit	786	7860	
Residential Estate	10.0/Unit	3972	39720	
Residential Low Density	10.0/Unit	19258	192580	
Res. Medium Low Density	10.0/Unit	1205	12050	
Residential Medium Density	10.0/Unit	5218	52180	
Residential High Density	5.4/Unit	6447	34814	
Res. Very High Density	3.7/Unit	157	581	
Mobile Home	5.4/Unit	1390	7506	
Retirement Community	3.3/Unit	1715	5660	
Downtown	481.3/Acre	41	19878	1
Retail Shopping	616.0/Acre	596	367259	1
Highway Commercial	1230.0/Acre	522	642183	1
Commercial Strip Business	359.1/Acre	80	28728	1
Office	308.0/Acre	147	45245	1
Industrial Park	276.6/Acre	1510	417666	1
Public	776.0/Acre	563	436733	1
Industrial General	52.4/Acre	285	14908	1

	Residential			Commercial	
	Home-Work	Home-Shop	Home-Other	Work	Non-Work
Trip Length	6.0	2.6	3.4	5.4	3.5
% Started Cold	88.6	40.4	58.8	77.8	27.6
Trip Speed	35	35	35	35	35
Percent Trip	27.3	21.2	51.5		

Vehicle Fleetmix

Vehicle Type	Percent Type	Leaded	Unleaded	Diesel
Light Duty Autos	72.8	1.5	95.9	2.6
Light Duty Trucks	14.3	2.4	94.9	2.8
Medium Duty Trucks	4.3	5.9	94.2	0.0
Heavy Duty Trucks	3.9	33.3	66.7	N/A
Heavy Duty Trucks	3.9	N/A	N/A	100.0
Motorcycles	0.9	100.0	N/A	N/A

Project Emissions Report in Ton/Day

Unit Type	TOG	CO	NOX
Rural Residential	0.0	0.4	0.1
Residential Estate	0.2	1.9	0.3
Residential Low Density	0.9	9.2	1.3
Res. Medium Low Density	0.1	0.6	0.1
Residential Medium Density	0.2	2.5	0.3
Residential High Density	0.2	1.7	0.2
Res. Very High Density	0.0	0.0	0.0
Mobile Home	0.0	0.4	0.1
Retirement Community	0.0	0.3	0.0
Downtown	0.1	0.7	0.1
Retail Shopping	1.3	12.1	2.2
Highway Commercial	2.3	21.2	3.9
Commercial Strip Business	0.1	1.0	0.2
Office	0.2	1.9	0.3
Industrial Park	1.9	19.2	3.0
Public	1.6	15.0	2.7
Industrial General	0.1	0.7	0.1
Total	9.2	88.8	14.9

Project Name: Vacaville Sketch Plan C Date: 04-03-90

Analysis Year = 2010 Temperature = 70
EMFAC7 VERSION : EMFAC7C ... 1/4/87

Unit Type	Trip Rate	Size	Tot Trips	Days Op.
Rural Residential	10.0/Unit	513	5130	
Residential Estate	10.0/Unit	3337	33370	
Residential Low Density	10.0/Unit	18720	187200	
Res. Medium Low Density	10.0/Unit	868	8680	
Residential Medium Density	10.0/Unit	4721	47210	
Residential High Density	5.4/Unit	6595	35613	
Res. Very High Density	3.7/Unit	316	1169	
Mobile Home	5.4/Unit	1392	7517	
Retirement Community	3.3/Unit	1715	5660	
Downtown	481.3/Acre	41	19878	1
Retail Shopping	616.0/Acre	828	509925	1
Highway Commercial	1230.0/Acre	333	409467	1
Commercial Strip Business	359.1/Acre	91	32606	1
Office	308.0/Acre	125	38346	1
Industrial Park	276.6/Acre	1600	442671	1
Public	776.0/Acre	425	329645	1
Industrial General	52.4/Acre	11	597	1

	Residential			Commercial	
	Home-Work	Home-Shop	Home-Other	Work	Non-Work
Trip Length	6.0	2.6	3.4	5.4	3.5
% Started Cold	88.6	40.4	58.8	77.8	27.6
Trip Speed	35	35	35	35	35
Percent Trip	27.3	21.2	51.5		

Vehicle Fleetmix

Vehicle Type	Percent Type	Leaded	Unleaded	Diesel
Light Duty Autos	72.8	1.5	95.9	2.6
Light Duty Trucks	14.3	2.4	94.9	2.8
Medium Duty Trucks	4.3	5.9	94.2	0.0
Heavy Duty Trucks	3.9	33.3	66.7	N/A
Heavy Duty Trucks	3.9	N/A	N/A	100.0
Motorcycles	0.9	100.0	N/A	N/A

Project Emissions Report in Ton/Day

Unit Type	TOG	CO	NOX
Rural Residential	0.0	0.2	0.0
Residential Estate	0.2	1.6	0.2
Residential Low Density	0.9	8.9	1.3
Res. Medium Low Density	0.0	0.4	0.1
Residential Medium Density	0.2	2.3	0.3
Residential High Density	0.2	1.7	0.2
Res. Very High Density	0.0	0.1	0.0
Mobile Home	0.0	0.4	0.1
Retirement Community	0.0	0.3	0.0
Downtown	0.1	0.7	0.1
Retail Shopping	1.8	16.8	3.1
Highway Commercial	1.5	13.5	2.5
Commercial Strip Business	0.1	1.1	0.2
Office	0.2	1.6	0.3
Industrial Park	2.1	20.3	3.2
Public	1.2	11.3	2.0
Industrial General	0.0	0.0	0.0
Total	8.5	81.2	13.6

Appendix 3

Outline of Consensus Points for Agreement between City of Vacaville and Solano Irrigation District

An outline of consensus points to be included in the proposed Agreement between the City of Vacaville and the Solano Irrigation District has been prepared by the City Attorney. It is included in this EIR to illustrate how the growth strategy in the proposed General Plan would be implemented, prime agricultural land outside the urban area would be preserved, and additional water supplies secured to serve new development.

April 9, 1990

To: General Plan Environmental Impact Report

From: Charles O. Lamoree, City Attorney

Re: Outline of Agreement Between Solano Irrigation District and City of Vacaville for Protection of Agricultural Lands

As part of the Vacaville General Plan amendment and revision process presently being undertaken, and the environmental impact report developed in conjunction with the General Plan, I have prepared this outline of the terms and conditions that would likely be a part of an agreement between the City of Vacaville and the Solano Irrigation District in support and furtherance of certain proposed general plan policies which are intended to protect prime agricultural land for review as part of the General Plan and E.I.R. process.

Document Contents	Subject Covered
Recitals	Early sections of the agreement would establish the factual background for the document. In effect, these would be "findings" which set the stage for the remainder of the agreement. The recitals will set forth those mutually agreed upon factors which enable the parties, through the agreement to: (1) carry out the applicable policies of the General Plan and (2) comply with the legal criteria by which public agencies can enter into contracts which may effect their police power. Initial recitals would discuss the General Plan under evaluation by this Environmental Impact Report.

Following recitals would list the goals and policies of the General Plan which are relevant to the agreement. Attached are draft recitals that establish that the purpose of the agreement is to achieve certain goals and policies of the general plan with respect to preservation of agricultural lands and the adoption of limitation on growth of the City during the period of the General Plan.

Additional recitals would tie the agreement into case law requirements for contracting matters which limit the future exercise of the Police Power. For example the recitals are likely to note the fundamental need of City for water and the ability of the District to provide the water in furtherance of the mutual goal of protecting prime agricultural land adjacent to the City by ensuring that City boundaries are defined through the general plan in such a manner that the development limits of the City support and protect agricultural lands and the District's provision of water to the City enables the City to fully develop within its planned municipal limits so that premature development of agricultural lands is avoided.

Finally, there would be a set of recitals that establish the need for, and basis of, damages should either party violate the agreement.

Definitions

Key terms would be defined so that consistent and agreed upon meanings can used both by those who developed the agreement and those who later interpret the document. Key terms that can be expected to be included in the agreement consistent with the general plan amendments and revisions primarily relate to the various planning

boundaries and limit lines proposed for adoption by the Vacaville City Council and which establish urban development limits which protect thereby adjacent agricultural lands. Maps and other diagrams of the general plan would be referenced in the agreement so that the urban limits of the City, would be sufficiently defined to insure that the mutual intent of the City and District are properly expressed.

Growth Limits

Sections in the main body of the agreement would set forth the provisions which limit both the City and District with respect to urban residential development and, thereby, insure the protection of agricultural lands. The City would agree to those limits adopted within the general plan.

Water Provision

Sections in the main body of the agreement would set forth the various water services and entitlements the District would provide to the City and the compensation for that consideration. This would define the water uses that the District provides to the City such as water for landscaping, parks, golf courses, business and commercial development, etc. These sections would reflect the policies of the general plan, the agreements presently in place between City and District, and the specific terms and conditions under the District would supply water to the City.

Enforcement

Sections in the main body of the agreement would set forth the means by which either the City or the District could enforce the agreement against the other. The agreement is likely to include provisions for specific performance of its terms. It may also

provide for mutually agreed upon remedies in lieu of specific enforcement since that remedy rests within the discretion of a judicial officer. Such alternate forms of dispute resolution may include monetary compensation, obligations to provide additional water or modifications in land use limitations

Miscellaneous

Usual and customary miscellaneous provisions will be added to the end of the agreement to provide for notice, severability, date, signature block, etc.

DRAFT RECITALS FOR AGREEMENT

A. City is undertaking a comprehensive revision and amendment of its General Plan, which revision and amendment is intended for adoption in or about August, 1990. This agreement has been prepared in conjunction with the proposed General Plan amendments and revisions with the expectation that it will be executed concurrently with the General Plan adoption and in coordination with the applicable policies in said General Plan amendment and revision.

B. The purpose of the General Plan is to express goals and policies for the physical and economic development of City over the contemplated planning period which is estimated to be twenty years from the date of adoption presently scheduled for in or about August, 1990. The lands encompassed within the General Plan include lands beyond the current corporate limits of City but which bear a reasonable planning relationship to the future physical and economic growth of City. The General Plan sets forth various means to implement these goals and policies which require further legislative action of the City Council.

C. The revised General Plan of City is proposed to contain certain goals of particular relevance to this Agreement including, but not limited to:

1. Ensuring that scarce natural resources, such as water, are allocated and utilized to maximize community benefits.

2. Ensuring that the rate of residential growth is consistent with availability of public facilities, infrastructure and services.

3. Protect the natural environment that City enjoys.

4. Establishing ultimate urban boundaries on the south, and long term limits on the east, west and north.

5. Accommodating reasonable urban growth consistent with regional housing needs while maintaining as much viable agricultural on prime agricultural soils as is practical and supportive of regional agricultural production. The revised City General Plan and this agreement recognize the need to give priority to the preservation and protection of prime agricultural lands that support efficient crop production.

6. Recognizing that urban sprawl is a problem for City, District and agricultural interests such that phased, moderate growth is beneficial to the community and a shared development policy between City and District could provide both urban and

agricultural interests a comprehensive and secure basis for future urban and agricultural investments.

7. That it is to the mutual benefit of City and District to support each other's predominate social purposes by:

(a) having City plan for and provide a buffer area on its northern and eastern limits order to protect viable, productive agriculture on prime lands in those areas from new urban expansion,

(b) having District supply additional water to City in order to facilitate urban development within prescribed boundaries which further District's goals of insuring the long-term stability of agricultural production.

(c) having City reserve existing water entitlements for use only within the general plan boundaries.

D. The General Plan contains plans and implementation measures for achieving the foregoing goals and policies including, but not limited to establishment of urban service limits, extension of public services in a comprehensive methodology to develop the City within the urban service limits, planning and limiting the oversizing of utilities to

focus urban development within the boundaries contemplated by this agreement.

E. The purpose of this Agreement is to support the implementation of the General Plan and to achieve the stated goals and policies expressed therein. The network of public capital facilities for delivery services forms the internal framework of City and is a precursor of economic and physical development. The timing and pattern of installing capital improvements as well as making available public services such as potable water allotments affects the implementation of the General Plan and the distribution of land uses. The availability of water plays a major role in determining the location, intensity and timing of future development. City can directly control the timing of construction of municipal improvements and the extension of urban services such as roads, sewers, storm drains, police and fire services, all of which are necessary for urban development, but which is planned and implemented in conjunction with the provisions of the agreement will protect prime agricultural lands that support efficient crop production. Because City alone cannot directly control the availability of water service itself, it must enter into this Agreement with District for those purposes. Coordination with District pursuant to this agreement will enable City to implement its revised and amended General Plan.

F. City currently provides certain limited water service from wells along Elmira Road, from Lake Berryessa through Putah South Canal and from the North Bay Aqueduct. Current water sources are insufficient to provide water during the planning period contemplated by the General Plan revisions and amendments. Accordingly, it is the further purpose of this Agreement to provide a long term water supply for city of sufficient quality and quantity as necessary for municipal expansion in order thereby to assist City in meeting its undated General Plan goals and policies, including satisfying its regional fair share of housing, while at the same time enabling District to meet its goals of protecting viable agricultural production in lands within or near to City's planning area.

G. District is a general purpose irrigation district which has in the past, and continues to provide water service, drainage and flood control in certain areas of Solano County. City has in the past, and continues to provide municipal services including delivery of treated water for residential, commercial, industrial and recreational uses of land and for the landscaping and public health and safety needs attendant thereto.

H. The primary public water supply for Solano County cities and districts is the Solano Water Project. At the time of the creation and construction of the Solano Water Project by the United States Bureau of Reclamation, contracts were

entered into with the Solano County Flood Control and Water Conservation District (now the Solano County Water Agency) for the distribution of the waters from such Project to those cities and districts located within the County that became member units of said project. At that time, most of the lands of the County were devoted to agricultural purposes, and the waters were apportioned and planned for use on this basis.

I. Extreme and unanticipated pressures for urbanization have developed within Solano County which have affected both those lands within municipal boundaries as well as land in unincorporated areas of the County, including large portions of property within District's boundaries and service areas. These growth pressures are inconsistent with and were not contemplated by existing water contracts, allotments and distributions. In particular, urban growth pressures have caused continued disruptions in the ability of District to protect and preserve prime agricultural lands. As increased urbanization has occurred in both incorporated and unincorporated areas of Solano County, District has been requested to supply waters to these urban areas from its apportionment from the Solano Project and from other sources available to District. City has insufficient water allotments to supply new urban uses beyond General Plan lines as they existed prior to the revisions and amendments contemplated by this agreement, and if such new water supplies are not made available then accommodation of new populational growth in

Solano County will be curtailed in present urban and municipal areas to the potential detriment of the preservation and protection of prime agricultural lands and the fair share housing needs of the region.

J. As the process of urbanization has occurred, District has attempted to develop other agricultural areas in Solano County to use the waters apportioned to District from the Solano Project. City and District both desire to protect the continued use of productive soils for agricultural purposes in the County of Solano. At the same time, the apportionment of water to City has gradually been consumed by the increased urban demands so that during the planning period contemplated by the General Plan, City requires additional sources of water for expansion. District recognizes this need of City and also recognizes that its ability to expand the agricultural use of water in other areas of the County not contiguous to city will take several years to develop.

K. The County of Solano has adopted land use plans calling for coordinated growth and preservation of certain areas for agricultural and open space use, and the Legislature of the State of California has declared its intent to limit urban sprawl and leapfrog urban development by enacting certain laws for controlling urbanization, protecting the environment and coordinating the services of governmental entities to preserve and advance these land use policies.

APR 12 '90 8:15 FROM CITY OF VACAVILLE PAGE.012

This Agreement is intended to be consistent with and carry out the spirit and intent of such legislative determinations.

L. City recognizes the necessity of maintaining the financial integrity of District and the necessity for District to provide agricultural water at economic prices for development of food and produce in the area. District recognizes the necessity of providing high quality water in adequate quantities to the City's present and future water users. City and District, by entering into this Agreement, believe that this voluntary and mutual agreement provides a pattern for development, urbanization and coordination of governmental services in the County of Solano between City and District this is consistent with the needs, goal and purposes of each agency.

M. It is recognized and agreed that maintenance and operation costs continue to be incurred by District due to urbanization of certain agricultural lands previously served by District operation and facilities. City and District wish to determine in advance the method of calculating reimbursement of such expenses to District in those additional areas where urbanization may occur. Similarly, it is recognized and agreed that City will incur costs resulting from urbanization which occurs in the unincorporated areas of the County within or adjacent to City's planning area boundaries. The parties, therefore, wish to determine the appropriate measure of those costs and provide for

reimbursement in the event that either additional District lands beyond those contemplated by this agreement are annexed by City or District serves water for urban uses within areas contemplated by this agreement.

Appendix 4

Conditions for Approval of Williamson Act Cancellations

APPENDIX 4

WILLIAMSON ACT CANCELLATIONS

GOVERNMENT CODE

SECTIONS 51282 AND 51284

51282. Cancellation as to all or part of land; conditions for approval.

(a) The landowner may petition the board or council for cancellation of any contract as to all or any part of the subject land. The board or council may grant tentative approval for cancellation of a contract only if it makes one of the following findings:

(1) That the cancellation is consistent with the purposes of this chapter (California Land Conservation Act of 1965; Williamson Act); or

(2) That cancellation is in the public interest.

(b) For purposes of paragraph (1) of subdivision (a) cancellation of a contract shall be consistent with the purposes of this chapter only if the board or council makes all of the following findings:

(1) That the cancellation is for land on which a notice of non-renewal has been served pursuant to Government Code Section 51245.
(2) That cancellation is not likely to result in the removal of adjacent lands from agricultural use.
(3) That cancellation is for an alternative use which is consistent with the applicable provisions of the city or county general plan.
(4) That cancellation will not result in discontiguous patterns of urban development.
(5) That there is no proximate non-contracted land which is both available and suitable for the use to which it is proposed the contracted land be put, or, that development of the contracted land would provide more contiguous patterns of urban development than development of proximate non-contracted land.

As used in this subdivision, "proximate, non-contracted land" means land not restricted by contract pursuant to this chapter, which is sufficiently close to land which is so restricted that it can serve as a practical alternative for the use which is proposed for the restricted land.

As used in this subdivision "suitable" for the proposed use means that the salient features of the proposed use can be served by land not restricted by contract pursuant to this chapter. Such nonrestricted land may be a single parcel or may be a combination of contiguous or discontiguous parcels.

(c) For purposes of paragraph (2) of subdivision (a) cancellation shall be in the public interest only if the council or board makes the following findings: (1) that other public concerns substantially outweigh the objectives of this chapter; and (2) that there is no proximate noncontracted land which is both available and suitable for the use to which it is proposed the contracted land be put, or, that development of the contracted land would provide more contiguous patterns of urban development than development of proximate noncontracted land.

As used in this subdivision "proximate, noncontracted land" means land not restricted by contract pursuant to this chapter, which is sufficiently close to land which is so restricted that it can serve as a practical alternative for the use which is proposed for the restricted land.

As used in this subdivision "suitable" for the proposed use means that the salient features of the proposed use can be served by land not restricted by contract pursuant to this chapter. Such nonrestricted land may be a single parcel or may be a combination of contiguous or discontiguous parcels.

(d) For purposes of subdivision (a), the uneconomic character of an existing agricultural use shall not by itself be sufficient reason for cancellation of the contract. The uneconomic character of the existing use may be considered only if there is no other reasonable or comparable agricultural use to which the land may be put.

(e) The landowner's petition shall be accompanied by a proposal for a specified alternative use of the land. The proposal for the alternative use shall list those governmental agencies known by the landowner to have permit authority related to the proposed alternative use, and the provisions and requirements of Section 51283.4 shall be fully applicable thereto. The level of specificity required in a proposal for a specified alternate use shall be determined by the board or council as that necessary to permit them to make the findings required.

(f) In approving a cancellation pursuant to this section, the board or council shall not be required to make any findings other than or in addition to those expressly set forth in this section, and, where applicable, in Section 21081 of the Public Resources Code.

51284. Public hearing; notice and publication.

No contract may be canceled until after the city or county has given notice of, and has held, a public hearing on the matter. Notice of the hearing shall be published pursuant to Section 6061 and shall be mailed to the Director of Conservation and every owner of land under contract, any portion of which is situated within the same agricultural preserve and within one mile of the exterior boundary of the land upon which the contract is proposed to be canceled.

Appendix 5

Williamson Act Non-Renewals
Filed as of March 1990

Solano County Williamson Act Contract Lands
Non-Renewals filed as of 3/90

Vacawac.wk1 is#4
3/16/90 Blayney-Dyett

Organized By Date Filed

Expired Within Plan. Area	Williamson Act Contract#	Preserve	Owner	Acreage Removed	Date Filed	Within P.A., Soon To Expire	Serial Date Filed
	489	409	Meddock	24.26	22-Apr-71		26045
	219	135	McCoy/Sand	111.39	23-Aug-72		26534
	940	847	Sanders		23-Aug-72		26534
	68	847	Lawler R	1853.32	13-Feb-73		26708
	679	602	Rodriquez	34.36	01-May-73		26785
	16	26	Swett R	3525.43	19-Jul-73		26864
	461	383	West	187.00	18-Oct-73		26955
	462	565	West	826.09	18-Oct-73		26955
*	463	566	West	51.26	18-Oct-73		26955
	336	191	Ton G. Lum	69.41	21-Jan-74		27050
	337	190	Ton Goon	66.25	21-Jan-74		27050
	963	869	Garcia	20.00	08-Apr-74		27127
	964	870	Garcia	20.00	08-Apr-74		27127
*	448	375	Ruth	201.30	17-Sep-74		27289
	648	569	Anheuser-Busch	69.57	04-Feb-77		28160
	942	849	Hunter	5.66	25-Feb-77		28181
	433	360	Anheuser-Busch	16.03	06-Oct-77		28404
	427	355	Painter	51.41	12-Dec-77		28471
	493	413	Tomasini/Corson	0.24	26-Jun-78		28667
	496	416	Tomasini/Corson	0.62	26-Jun-78		28667
	1066	962	Cerutti	317.56	15-Sep-78		28748
	1067	963	Cerutti	156.97	15-Sep-78		28748
*	740	660	Evanikoff	115.98	24-Oct-78		28787
*	741	661	Evanikoff	159.87	24-Oct-78		28787
	343	150	Panizza	136.22	02-Feb-79		28888
*	344	187	Panizza	79.09	02-Feb-79		28888
	353	187	Panizza	39.19	02-Feb-79		28888
	113	56	Olin Timm	40.09	21-Apr-80		29332
	512	431	Nortier	35.00	10-Nov-80		29535
	406	231	Rogers	117.26	25-Nov-80		29550
	899	809	Damiano	24.95	01-Dec-80		29556
	612	533	Robbins	81.89	03-Dec-80	1991	29558
	613	534	Robbins	164.84	03-Dec-80	1991	29558
	573	494	Hockett	75.11	04-Dec-80		29559
	787	704	Emigh	404.00	04-Dec-80		29559
	992	894	Juccrevich	19.70	30-Dec-80		29585
	1075	967	Fuschlin	49.15	24-Feb-81		29641
	412	339	Marianno	36.20	13-Mar-81		29658
	413	340	Marianno	2.00	13-Mar-81		29658
	898	808	Ray/Ezrol	30.75	24-Mar-81		29669
	1129	1024	Ray/MSA	31.43	24-Mar-81	1992	29669
	131	85	Souza	796.00	20-May-81		29726
	720	638	Kent	39.73	20-May-81		29726

Expired Within Plan. Area	Williamson Act Contract#	Preserve	Owner	Acreage Removed	Date Filed	Within P.A., Soon To Expire	Serial Date Filed
	1151	1064	Peterson/H	199.00	26-May-81		29732
	1103	1109	Mangels	38.00	11-Jun-81		29748
	105	80	Vaca Fill	319.83	21-Jul-81		29788
	719	637	Wirth	39.80	11-Aug-81		29809
	885	799	Barrett	74.40	31-Aug-81		29829
	624	706	DOW Chem	2765.69	09-Sep-81		29838
	644	564	Wiegand	79.12	15-Sep-81		29844
	1144	1040	Bidstrup	105.33	29-Sep-81		29858
	732	654	Sieber	63.00	05-Nov-81		29895
	898	808	Ray/Ezrol	27.93	16-Nov-81		29906
	33	43	Lambrecht	79.01	25-Nov-81		29915
	578	499	Wolfskill	74.32	16-Dec-81		29936
	113	56	Olin Timm/Os	40.00	28-Jan-82		29979
	53	104	Nolan	45.46	02-Feb-82		29984
	762	681	Leach	23.76	08-Feb-82	1993	29990
	43	107	Noonan	142.24	11-Feb-82		29993
	221	191	Dally	58.95	11-Feb-82		29993
	280	191	Dally	24.15	11-Feb-82		29993
	758	676	Moriel	20.00	09-Mar-82		30019
	577	498	Rudolph	1.21	12-Apr-82		30053
	1014	929	Azevedo	43.38	13-May-82		30084
	3	6	Smith	2238.68	18-May-82		30089
	1058	954	Reich	79.39	21-May-82	1993	30092
	113	56	Olin Timm/Ar	41.00	09-Jun-82		30111
	388	214	Spiller	26.62	09-Jul-82		30141
	793	710	Clark	25.09	07-Dec-82		30292
	876	788	Clark	19.77	07-Dec-82		30292
	942	849	Benthien	61.26	29-Dec-82		30314
	388	214	Jackman/Tr	24.63	18-Jan-83		30334
	660	574	Martin	262.00	08-Jul-83		30505
	873	786	Nelson	166.55	20-Jul-83		30517
	1137	1032	Moran	50.00	25-Aug-83		30553
	532	653	Amos Andrews	76.63	16-Nov-83		30636
	51	51	B&L Prop	110.29	26-Jan-84		30707
	927	836	Amos Andrews	3.00	29-Mar-84		30770
	1135	1030	Matz	220.51	04-Mar-85		31110
	990	892	Borges	233.58	12-Apr-85		31149
	1011	916	Azevedo	748.93	17-Apr-85		31154
	1012	917	Azevedo	65.00	17-Jun-85		31215
	59	95	Irving	134	27-Nov-85		31378
	602	523	Caldwell	0.38	10-Jan-86		31422
	942	849	Zicari	4.21	31-Jan-86		31443
	674	597	Farmer	8.6	10-Feb-86	1997	31453
	113	56	Mattson/Price	41	29-Jul-86		31622
	746	664	Dant	1.042	07-Aug-86		31631
	611	532	Alonzo/G	228.76	12-Dec-86		31758
	488	408	Wong	61.38	23-Dec-86		31769
	705	623	Wong	95.17	23-Dec-86		31769
	4	7	Gill	453.18	13-Jan-87		31790

Expired Within Plan. Area	Williamson Act Contract#	Preserve	Owner	Acreage Removed	Date Filed	Within P.A., Soon To Expire	Serial Date Filed
	350	179	Gill/Scof	508.9	13-Jan-87		31790
	41	107	Noonan	86	10-Feb-87		31818
	42	107	Noonan	505.78	10-Feb-87		31818
	44	107	Noonan	230.67	10-Feb-87		31818
	118	84	Paulson	0.09	27-Feb-87		31835
	746	664	Paulson	0.94	27-Feb-87		31835
	661	575	Hammond		02-Apr-87		31869
	1135	1030	Gnos	258.03	01-May-87		31898
	1099	993	Maher		14-Dec-87		32125
	60	60	Pippo		18-Dec-87		32129
	420	347	Mishikawa		24-Dec-87		32135
	352	186	Schulze		08-Feb-88		32181
	314		Brage		11-Feb-88		32184
	342		Brage		11-Feb-88		32184
	670	584	Cravea	19.48	25-Mar-88		32227
	934	842	Cravea	61.04	31-Mar-88		32233
	1041	938	Dodini	20	27-May-88		32290
	1176	1070	Lindeman	15.34	14-Jul-88		32338
	83	63	Gill,Fl	188.9	13-Jan-89		32521
	710	628	Davis	73.26	13-Jan-89		32521
	235	181	Midway-Dixon	81.6	09-Feb-89		32548
	261	150	Midway-Dixon	267.68	09-Feb-89		32548
	596	517	Cheechov	47.71	09-Mar-89		32576
	210	173	Rogers	22.96	20-Mar-89		32587
	210	173	Rogers	22.96	20-Mar-89		32587
	1000	902	Senge	184.51	06-Apr-89		32604
	574	495	Papin	17.22	10-Apr-89		32608
	38	107	Kelly	357.53	20-Apr-89		32618
	41	107	Kelly	108.46	20-Apr-89		32618
	950	858	Alonzo	150	25-May-89		32653
	979	884	McCormack	190	06-Jun-89		32665
	1040	937	Dodini	20	12-Jun-89		32671
	276	151	Vaca Farming Co.	240.59	07-Jul-89		32696
	419	346	Nishikawa Farms	212.7	01-Sep-89		32752
	834	748	Nishikawa Farms	500	01-Sep-89		32752
	502	422	Souza	103.81	19-Oct-89		32800
	1033	930	Mason	478.05	23-Oct-89		32804
	813	730	Brazleton	196.02	27-Oct-89		32808
	823	740	McCormack Jr.	156.98	03-Nov-89		32815
	807	724	Brann	154.01	13-Nov-89		32825
	808	725	Brann	156.48	13-Nov-89		32825
	238	29	Sacramento Dev.	106.38	14-Nov-89		32826
	54	105	Betschert	13.3	27-Nov-89		32839
	54	105	Wiegand	26.41	27-Nov-89		32839
	819	736	Wiegand	15.6	27-Nov-89		32839
	182	120	Sattlemeyer	156.87	04-Dec-89		32846
	549	470	Campbell	150.57	04-Jan-90		32877
	103	57	Hamel Ranch	364.2	05-Feb-90		32909
	104	57	Hamel Ranch	469.05	05-Feb-90		32909

Expired Within Plan. Area	Williamson Act Contract#	Preserve Owner	Acreage Removed	Date Filed	Within P.A., Soon To Expire	Serial Date Filed
	650	586 Mason	273	06-Feb-90		32910
	1045	941 Mason/Lindeman	374	06-Feb-90		32910

Source: Solano County Planning Department

Appendix 6

Common Plants Observed in the Ulatis Creek Development Area

APPENDIX 6
COMMON PLANTS OBSERVED IN THE ULATIS CREEK DEVELOPMENT AREA VACAVILLE, CALIFORNIA JANUARY 1990

Common Name	Scientific Name
TREES	
Cottonwood	*Populus fremonti*
Red willow	*Salix laevigata*
Sandbar willow	*S. hindsiana*
Northern California black walnut	*Juglans hindsii*
Black walnut	*Juglans nigra*
Oregon ash	*Fraxinus latifolia*
Valley oak	*Quercus lobata*
Fremont cottonwood	*Populus fremontii*
Bigleaf maple	*Acer macrophylla*
California buckeye	*Aesculus californicus*
Eucalyptus	probably *E. rostrata*
Eucalyptus	*E. globulus*
SHRUBS AND VINES	
Mule fat	*Baccharis viminea*
Elderberry	*Sambucus mexicana*
California grape	*Vitis californica*
California rose	*Rosa californica*
Poison Oak	*Toxicodendron diversilobum*
Toyon	*Heteromeles arbutifolia*

Common Name	Scientific Name
HERBS AND GRASSES	
Cattails	*Typha* sp.
Sedges	*Cyperus* sp. and *Carex* sp.
English ribwort	*Plantago latifolia*
Hamilaya-berry	*Rubus procerus*
Alfalfa	*Medicago sativa*
Cress	*Rorippa* sp. (likely)
Water smartweed	*Polygonum punctatum*
Dock	*Rumex* sp.
Periwinkle	*Vinca major*
Giant reedgrass	*Arundo donax*
Johnson grass	*Sorghum halepense*
Cranesbill	*Erodium* spp.
Mustard	*Brassica* spp.
Prickly lettuce	*Lactuca Serriola*
Wild radish	*Raphanus sativus*
Yellow star thistle	*Centaurea solstitialis*
Needlegrass	*Stipa pulchra*
June grass	*Koeleria cristata*
ASSORTED ADDITIONAL VEGETATION	
Mariposa lilies	
Lupines	
California poppies	
Wild oats	
Brome	
Fescue	
Barley	
Ryegrass	
Wildrye	
Alkali rye	

SOURCE: ESA, *Ulatis Creek Development Area Plan*, January 1990.

Appendix 7

Common Plants Observed in the Riparian Habitat Along Alamo Creek

APPENDIX 7
COMMON PLANTS OBSERVED IN THE RIPARIAN HABITAT ALONG ALAMO CREEK
VACAVILLE, CALIFORNIA
JANUARY 1981

Common Name	Scientific Name
TREES	
Blue oak	*Quercus douglassi*
Valley oak	*Quercus lobata*
Black walnut	*Juglans nigra*
English walnut	*Juglans regia*
California walnut	*Juglans hindsii*
Arroy willow	*Salix lasiolepis*
Yellow willow	*Salix lasiandra*
Cottonwood	*Populus fremontii*
Big leaf maple	*Acer macrophyllum*
Buckeye	*Aesculus californica*
Blue gum	*Eucalyptus globulus*
Almond	*Prunus amygdalus*
California bay	*Umbellularia californica*
SHRUBS AND VINES	
California rose	*Rosa californica*
Coyote bush	*Baccharis pilularis*
Blue elderberry	*Sambucus mexicana*
Blackberry	*Rubus* sp.
Grape	*Vitus* sp.
HERBS AND GRASSES	
Wild oats	*Avena* sp.
Cattail	*Typha latifolia*
Sedges	*Carex* sp.
Rushes	*Juncus* sp.
Dock	*Rumex* sp.
Mustard	*Brassica* sp.

SOURCE: Torrey & Torrey Inc., *Vacaville Southeast Sector EIR.* November 1981.

BIRD SPECIES OBSERVED IN THE RIPARIAN HABITAT ALONG ALAMO CREEK
VACAVILLE, CALIFORNIA
JANUARY 1981

Marsh hawk
White-tailed kite
Sharp-shinned hawk
Cooper's hawk
Red tailed hawk
Kestrel
California quail
Ring-necked pheasant
Kildeer
Western meadowlark
Savanna sparrow
Lark sparrow
White-crowned sparrow
Song sparrow
Yellow-billed magpie
Mockingbird
Warblers
Starling
House finch
Fox sparrow
Golden crowned sparrow
Red shafted flicker
Acorn woodpecker
Scrub jay
Anna's hummingbird
White-breasted nuthatch
Black phoebe

SOURCE: Torrey & Torrey Inc., *Vacaville Southeast Sector EIR*, November 1981.

Appendix 8

Vertebrates Expected in the Ulatis Creek Development Area

APPENDIX 8

VERTEBRATES EXPECTED IN THE ULATIS CREEK DEVELOPMENT AREA
VACAVILLE, CALIFORNIA
JANUARY 1990

FISH

- Riffle sculpin
- Golden shiner
- Flathead minnow
- Carp
- Goldfish
- Gambusia
- California roach
- Western sucker
- Three-spined stickleback
- Rainbow trout

AMPHIBIANS

- California newt
- California slender salamander
- Western toad
- Pacific treefrog
- Yellow-legged frog
- Bullfrog

REPTILES

- Western fence lizard
- Coast horned lizard
- Western skunk
- Southern alligator lizard
- Western ringneck snake
- Racer
- Striped racer
- Gopher snake
- Western garter snake
- Western rattlesnake

BIRDS

- White-tailed kite
- Sharp-shinned hawk
- Cooper's hawk
- Red-tailed hawk
- Kestrel
- California quail
- Ring-necked pheasant
- Mourning dove
- Barn owl
- Sreech owl
- Anna's hummingbird
- Common flicker
- Plan titmouse
- Common bushtit
- Bewick's wren
- Mockingbird
- Robin
- Loggerhead shrike
- Starling
- Savannah sparrow
- Lark sparrow
- White-crowned sparrow
- Song sparrow
- Fox sparrow

(continued on next page)

BIRDS *(continued)*

Acorn woodpecker	Golden-crowned sparrow
Western kingbird	Western meadow lark
Black phoebe	Red-winged blackbird
Violet-green sparrow	Brewer's blackbird
Tree swallow	House finch
Barn swallow	Common goldfinch
Cliff swallow	Rufous-sided towhee
Scrub jay	Chestnut-backed chickadee

MAMMALS

Broad-handed mole	Western harvest mouse
California myotis	Deer mouse
Big brown bat	California meadow mouse
Red bat	Opossum
Pallid bat	House mouse
Mexican free-tailed bat	Black rat
Brush rabbit	Raccoon
Beechey ground squirrel	Stripped skunk
Botta pocket gopher	Feral cat

SOURCES: Stebbins Robert. 1959. *Reptiles and Amphibians of the San Francisco Bay Area.* University of California Press, Berkeley.

Brown, Vinson, and Henry Reston. 1961. *Handbook of California Birds.* Nature Graph Co., Healdsburg.

Berry, William D. and Elizabeth. 1959. *Mammals of the San Francisco Bay Area.*

FROM: ESA, *Ulatis Creek Development Area Plan EIR.* January 1990.

Appendix 9

Widlife Species that Utilize or Potentially Utilize San Joaquin Valley and Deltaic Habitat at Some Time During the Year

APPENDIX 9
WILDLIFE SPECIES THAT UTILIZE OR POTENTIALLY UTILIZE SAN JOAQUIN VALLEY & DELTAIC HABITAT AT SOME TIME DURING THE YEAR

This species list was compiled for the Manzanita New Town DEIR (1982), and includes species which inhabit both deltaic and agricultural habitat.

The list was included in the Solano County Rural Residential Land Use Update DEIR, May 1988, since some of the species were assumed to be representative of those which might be found in the English Hills - North Vacaville area or the Green Valley Creek area in Green Valley.

Amphibians[1]

Western Toad	*Bufo Boreas*

Reptiles[1]

Western Fence Lizard	*Sceloporus accidentalis*
Gopher Snake	*Pituophos melanoleucus*
Common Kingsnake	*Lompropeltis getulus*

Birds[2]

Double-Crested Cormorant	*Phalocrocorax auritus*
Great Blue Heron	*Ardea heredias*
Green Heron	*Butorides striatus*
Great Egret	*Casmedodius albus*
Mallard	*Abas platyrhynchos*
Wood Duck	*Aix sponsa*
Turkey Vulture	*Cathertes aura*
White-Tailed Kite	*Elanus leucurus*
Cooper's Hawk	*Accipiter Cooperii*
Sharp-Skinned Hawk	*Accipiter striatus*
Red-Tailed Hawk	*Buteo jamaicensis*

(continued on next page)

Birds[2] (continued)

Golden Eagle	*Aquila chrysaetos*
Marsh Hawk	*Circus Cynaneus*
Merlin	*Falco Columbarius*
American Kestrel	*Falco sparverius*
California Quail	*Lophortyx californicus*
Ring-Necked Pheasant	*Phasianus colchicus*
Kildeer	*Charadrius vociferus*
Rock Dove	*Columba livia*
Mourning Dove	*Zanaida macroura*
Burrowing Owl	*Athene cunicularia*
Black-Chinned Hummingbird	*Archilochus alexandri*
Anna's Hummingbird	*Calypte anna*
Belted Kingfisher	*Ceryle alcyon*
Common Flicker (Red)	*Colaptes auratus*
Acorn Woodpecker	*Melanerpes formicivocus*
Red-Breasted Sapsucker	*Sphyrapicus ruber*
Yellow-Bellied Sapsucker	*Sphyrapicus thyroideus*
Hairy Woodpecker	*Picoides villosus*
Nuttall's Woodpecker	*Picoides nuttallii*
Black Phoebe	*Sayornis nigricans*
Say's Phoebe	*Sayornis saya*
Tree Swallow	*Iridoprocae bicolor*
Barn Swallow	*Hirunda rustica*
Cliff Swallow	*Petrochelidar pyrrhhonota*
Scrub Jay	*Aphelocoma coprulescens*
Yellow-Billed Magpie	*Pica nuttalli*
Common Crow	*Coruus brachyrhanchos*
Plain Titmouse	*Porus inornatus*
Bushtit	*Psaltriparus minimus*
White-Breasted Nuthatch	*Sitta carolinensis*
Bewick's Wren	*Thryomanes bewickii*
Northern Mockingbird	*Mimus polyglottas*
American Robin	*Turdus migratorius*
Varied Thrush	*Zoothera naenia*
Hermit Thrush	*Catharus guttatus*
Western Bluebird	*Sialia mexicana*
Ruby-Crowned Kinglet	*Regulus calendula*
Cedar Waxwing	*Bombycilla cedrorum*
Loggerhead Shrike	*Lanius ludovivianus*
Starling	*Sturnus vulgaris*
Wilson's Warbler	*Wilsonia pusilla*
House Sparrow	*Passer domesticus*

(continued on next page)

Birds[2] *(continued)*

Western Meadowlark	*Sturnella neglecta*
Red-Winged Blackbird	*Agelaius phoeniceus*
Northern Oriole	*Ichterus galbula*
Brewer's Blackbird	*Euphagus cyonopechalus*
Western Tanager	*Piranga ludoviciana*
Black-Headed Grosbeck	*Pheucticus melanocephalus*
House Finch	*Carpodacus mexicanus*
American Golfinch	*Cardulis tristis*
Lesser Goldfinch	*Carduelis psaltria*
Rufous-Sided Towhee	*Pipilo prythrophthalmus*
Brown Towhee	*Pipilo fuscus*
Savannah Sparrow	*Passerculus sandwichensis*
Lark Sparrow	*Chondestes grammacus*
Dark-Eyed Junco (Ore)	*Junco hyemalis*
White-Crowned Sparrow	*Zonotrichia leucophrys*
Golden-Crowned Sparrow	*Zonotrichia atricapilla*

Mammals[1]

Broad-Footed Mole	*Scapanus latimanus*
Desert Cottontail	*Sylvilagus audubonii*
Black-Tailed Jackrabbit	*Lepus californicus*
California Ground Squirrel	*Spermophilus beecheyi*
Botta's Pocket Gopher	*Thomomys bottae*
Western Harvest Mouse	*Reithrodotomys megalotis*
California Vole	*Microtus californicus*
Black Rat	*Rattus rattus*
Norway Rat	*Rattus norvegicus*
House Mouse	*Mus musculus*

SOURCES:

1 Determined from Delta Wildlife Habitat Protection and Restoration Plan, Sacramento/San Joaquin, 1980. Madrone Associates.

2 Determined from Spring and Christmas counts of the Davis Chapter, National Audubon Society and from field observations during the preparation of this document.

FROM: Solano County, *Manzanita New Town DEIR*, 1982.

Appendix 10

Common Plants Observed Near Nut Tree Road

APPENDIX 10

COMMON PLANTS
OBSERVED NEAR NUT TREE ROAD
VACAVILLE,CALIFORNIA
MARCH 1979

Common Name	Scientific Name
TREES	
Cherry	*Prunus avium*
Apricot	*P. armeniaca*
Peach	*P. persica*
Almond	*P. amygdalus*
Valley oak	*Quercus lobata*
Black walnut	*Hyglans nigra*
English walnut	*J. regia*
California walnut	*J. hindsii*
Arroyo willow	*Salix lasiolepis*
Yellow willow	*S. lasiandra*
Sandbar willow	*S. hindsiana*
Cottonwood	*Populus fremontii*
Bigleaf maple	*Acer macrophllum*
Buckeye	*Aesculus californica*
Blue gum	*Eucalyptus globulus*
Red gum	*E. rostrata*
SHRUBS AND VINES	
California rose	*Rosa californica*
Vinegar weed	*Trischostema lanceolatum*
Blue elderberry	*Sambucus mexicana*
Tree tobacco	*Nicotiana glauca*
HERBS AND GRASSES	
Bromes	*Bromus* spp.
Fescues	*Festuca* spp.
Wild rye	*Elymus condensatus*
Alkali rye	*E. triticoides*
Barleys	*Hordeum* spp.
Ryegrasses	*Lolium multiflorum*
June grass	*Koeleria cristata*
Wild oats	*Avena* spp.

(continued on next page)

HERBS AND GRASSES (continued)

Needlegrass	*Stipa pulchra*
Bermuda grass	*Cynondon dactylon*
Smilo	*Oryzopsis miliacea*
Johnson grass	*Sorghum halapense*
Cattail	*Typha* spp.
Tule	*Scirpus californicus*
Sedges	*Carex*
Duckweed	*Lemna gibba*
Rushes	*Juncus* spp.
Wild hyacinth	*Brodiaea pulchella*
Mariposa	*Calochortus luteus*
Knotweed	*Polygonum aviculare*
Dock, sheep sorrel	*Rumex* spp.
Pigweeds	*Amaranthus*
California poppy	*Eschscholtzia californica*
Mustards	*Brassica* spp.
Lupines	*Lupinus* spp.
Alfalfa	*Medicago sativa*
Bur clover	*M. hispida*
Yarrow	*Achillea millefolium*
Milk thistle	*Silybum marianum*
Coyote brush	*Baccharis pilularis*
Prickly lettuce	*Lactuca serriola*
Yellow star thistle	*Centaurea solstitialis*

TREE CULTIVARS

Lemon, orange, grapefruit, citron, grape, pomegranate, olive, lilac, Strawberry tree, deidar cedar, Canary Island pine, incense cedar, Arborvitae, Italian cypress, cycad.

SOURCE: Madrone Associates, *Cal Com Development FEIR*, March 1979.

Appendix 11

TJKM's Technical Report

TECHNICAL REPORT FOR THE GENERAL PLAN UPDATE TRANSPORTATION STUDY IN THE CITY OF VACAVILLE

APRIL 24, 1990

Prepared by:

TJKM Transportation Consultants
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56-065R.1EW

jlb

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CHAPTER 1

INTRODUCTION

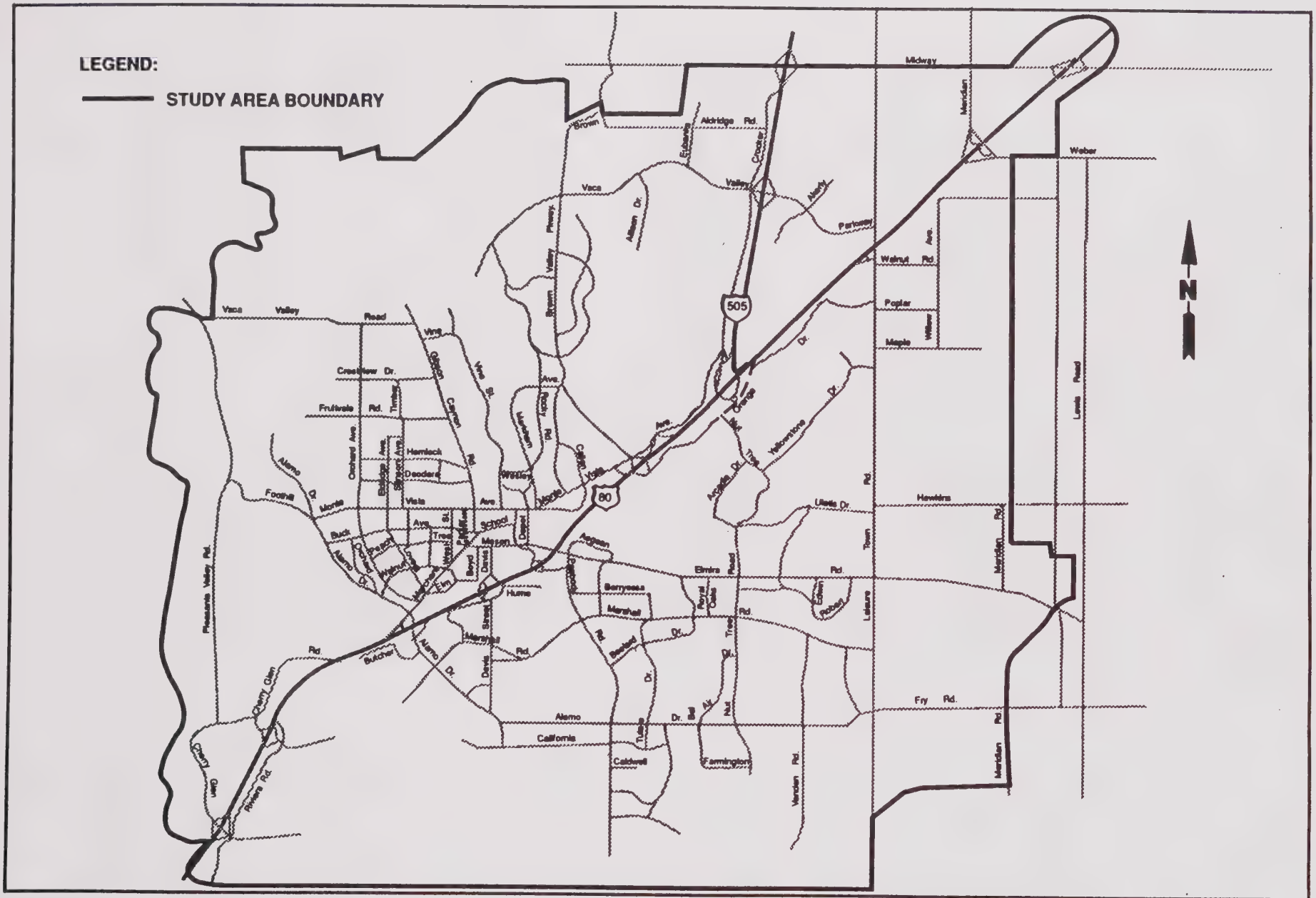
The overall purpose of the transportation element of the General Plan Update was to determine the ultimate roadway lane configurations needed to accommodate the revised land use plan for buildout of the City of Vacaville study area. This was done by generating future p.m. peak hour traffic volumes using a computer traffic model, "MINUTP". The model is used to test the impacts of various modifications to the Vacaville street network and to determine impacts of changes to the City's General Plan. This report summarizes the results and recommendations determined from the Vacaville Citywide traffic study.

The traffic study incorporated present and future land uses within the City service area. This service area consists of the boundary shown in Figure 1. For areas outside Vacaville it was assumed that existing Solano County residential areas would continue to grow. Future through traffic growth was based on historic trends determined from Caltrans traffic counts.

The p.m. peak hour, which occurs between 4 to 6 p.m., was used because it has the highest Citywide traffic levels. This was determined through the analysis of existing traffic counts. It is acknowledged that some streets have higher peaks at different hours; but overall, the Citywide p.m. peak hour (4 to 6 p.m.) is the highest.

The traffic model was calibrated through an existing conditions model. The calibration runs fine tuned the model's assumed trip generation rates, distribution patterns, and roadway network speeds and capacities.

The future condition model used trip generation rates and the distribution pattern developed through the existing conditions model and projected future land uses in the study area. The future condition model was an estimate of the land uses and traffic conditions due to build-out of the proposed City of Vacaville General Plan. Chapter 3 further describes each of the future condition models.



VACAVILLE DRAFT GENERAL PLAN UPDATE

FIGURE 1 STUDY AREA BOUNDARY

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In order for the circulation network, both citywide and regionally, to accommodate the build-out of the proposed General Plan, several things would need to occur. They are either a decrease in land use densities, implementation of a very aggressive TSM program, construction of new local and regional roadways or a combination of all three.

This study specifically analyzes 37 major intersections which are near freeway interchanges and/or are high volume intersections. Once a General Plan is adopted the Citywide Transportation needs to be updated to include the findings of this report and to specifically analyze the remaining major intersections in the Study Area. This study is not intended to be used as the analysis for specific development proposals.

In public meetings regarding future acceptable intersection and roadway levels of service (LOS), the City Council decided that, where feasible, a LOS C should be used. LOS C was chosen to allow for future growth in the Vacaville area beyond the General Plan build-out timeframe. Unlike other public facilities, roads are more difficult and costly to come back at some time in the future and widen to accommodate future demand. The City Council felt that its better to design additional capacity in the road network at this time and as a minimum reserve the right-of-way to account for future needs. They chose this policy rather than design for a LOS D or worse at this time and then need to come back in 20 years to buy right-of-way to accommodate future traffic.

Included in Appendix A is a description of how a traffic model works and a definition of technical terms.

CHAPTER 2

MODEL CALIBRATION AND DEVELOPMENT

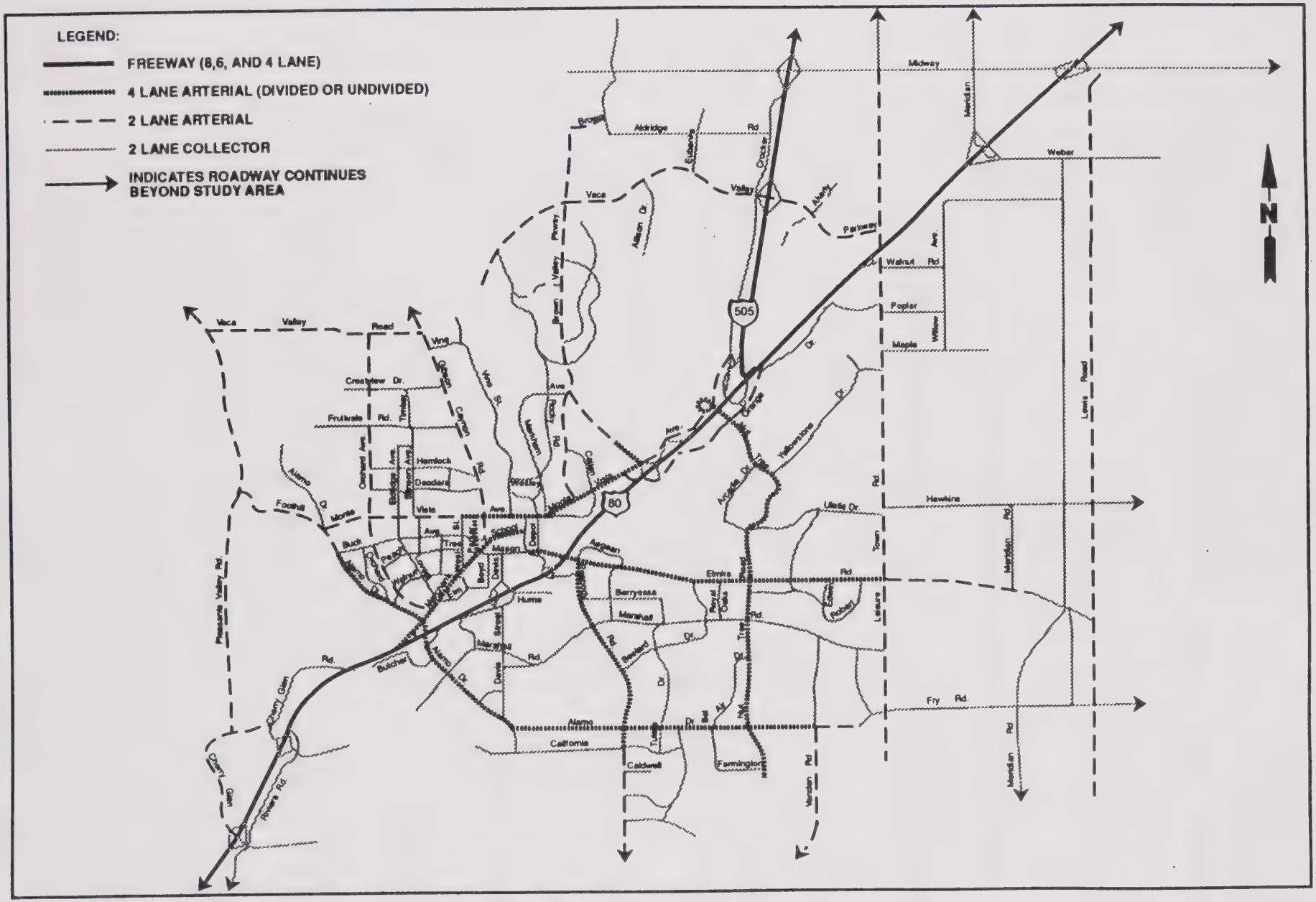
In order to model a location or community, it is necessary to calibrate the model to an area's particular trip generation and travel characteristics. The existing land use data and existing roadway network data (shown in Figure 2) are used in the transportation model to adjust trip generation rates or travel parameters until the model's projected existing traffic volumes reflect those actually occurring on a community roadway network. This process is necessary to increase confidence in the transportation model future traffic projection results.

Model Description

In this study, a computerized modeling system called Microcomputer Urban Transportation Package or "MINUTP" was utilized to simulate and project future traffic conditions in Vacaville. The system, developed from the Federal Highway Administration (FHWA) Transportation Model "UTPS" Urban Transportation Planning System for large mainframe computers, uses a gravity model technique to assign traffic to a street system based on existing and projected land uses. The "MINUTP" system is one of the more sophisticated transportation planning software systems currently available for a micro-computer. The system operates on an IBM compatible personal computer, and adapts many of the programming options and sophistication previously only available on a large urban system model utilizing a mainframe computer.

Model Development

To determine the traffic impacts of development in Vacaville, it was necessary to establish a total study area and a detailed modeling study area. The total study area included all of Vacaville and destinations outside Vacaville such as Sacramento, Fairfield, the Bay Area, and other areas of Solano and Yolo Counties. Large super zones were used to aggregate data in the total study area. See Table I for a listing of the super zones and their service areas.



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FIGURE 2 EXISTING ROADWAYS BY TYPE

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The existing and future modeling study area boundaries were developed and consist of the limits of the City service area. In developing the existing and future conditions transportation models, the study area was divided into 370 separate traffic zones and 19 super zones.

TABLE I

SUPER ZONE/CORDON STATION SERVICE AREA ASSUMPTIONS

CORDON STATION	SUPER ZONE SERVICE AREA
401 (Interstate 80)	Fairfield and the Bay Area
402 (Pleasants Valley Road)	Winters, Lake Berryessa, Napa, and North Solano County
403 (Gibson Canyon Road)	North Solano County and West Yolo County
404 (Brown Valley Road)	North Solano County and West Yolo County
405 (Interstate 505)	Winters and Woodland
406 (Leisure Town Road)	Solano and Yolo County, Travis AFB, and Rio Vista
407 (Interstate 80)	Davis, Dixon, and Sacramento
408 (Kilkenny Road)	East Solano County

TABLE I (Continued)

409 (Hawkins Road)	East Solano County
410 (Elmira Road)	East Solano County
411 (Fry Road)	East Solano County
412 (Meridian Road)	South Solano County & Travis AFB
413 (Leisure Town Road)	South Solano County
414 (Vanden Road)	Fairfield & Travis AFB
415 (Peabody Road)	Fairfield & Travis AFB
416 (Midway Road)	East Solano County
417 (Midway Road)	West Solano County
418 (Weber Road)	East Solano County
419 (Meridian Road)	North Solano County

The boundaries of the traffic zones were determined by examining the location of existing and future roads, existing and future land uses and other physical boundaries such as rivers, freeways, and railroad facilities.

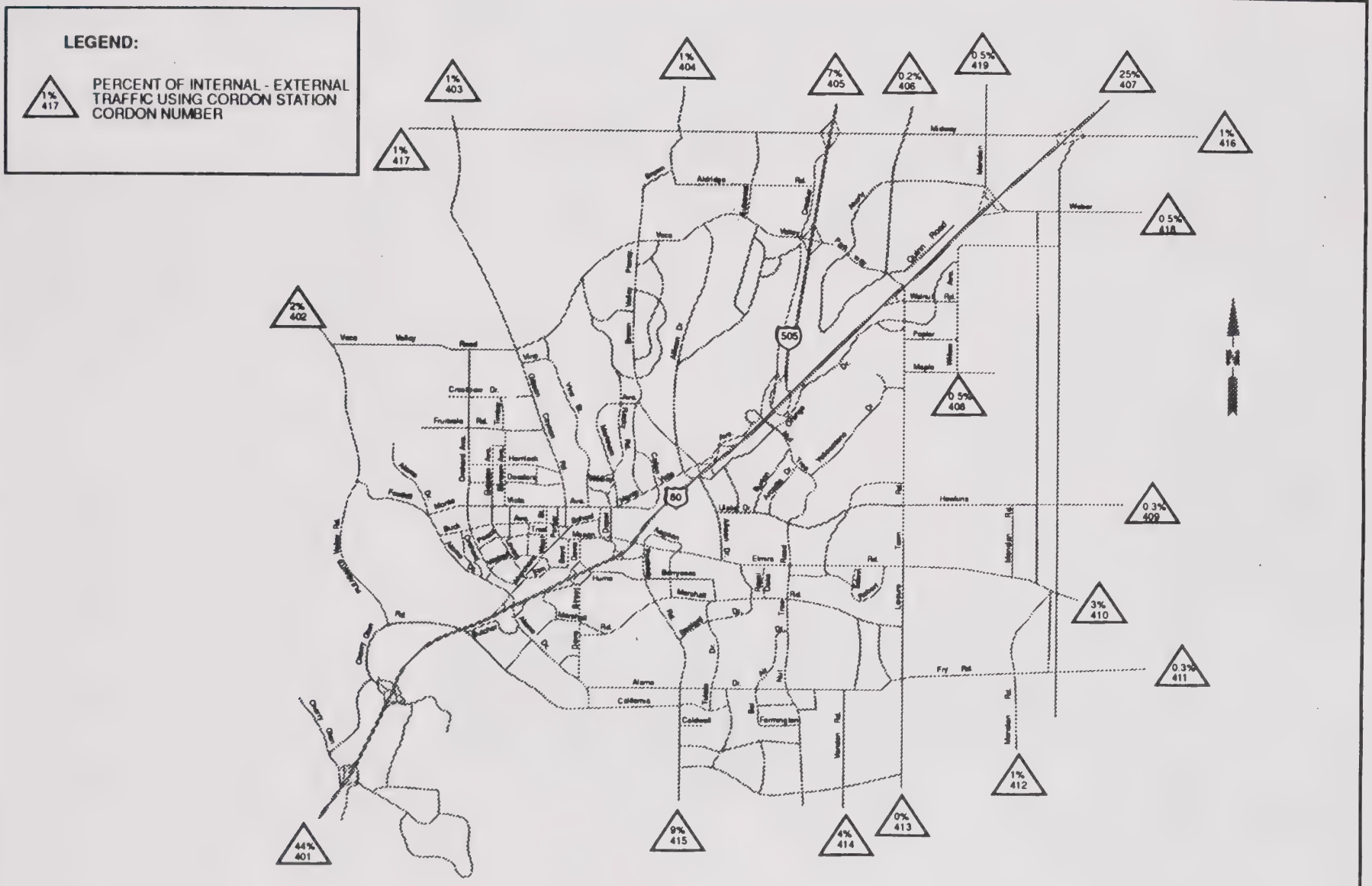
Super zones were used to aggregate trip productions and attractions in the areas outside the model study area. The super zones were designated in the model as external cordon stations and are located at all major roadways into and out of the study area (see Figure 3). The cordon station locations also identify all routes which may be used by through traffic. Traffic produced by or attracted to the study area with origins or destinations outside the study area (internal-external or external-internal trips) will use the cordon stations. The percentage of internal-external and external-internal trips that are likely to use each cordon is shown on Figure 3.

Through traffic is defined as trips which have both origins and destinations outside the study area, yet travel through it. Existing through traffic levels were estimated by calculating the difference between field counts and the City-only traffic volumes projected by the computer model. Future through (external-external) traffic was determined by factoring the existing through traffic volumes with a growth rate of 1 percent per year. The growth rate was calculated using Caltrans traffic volumes on Interstate 80 and Interstate 505 for the last 10 years. Additional traffic is generated from projected land use in the study area.

Trip Generation

Model study area trip generation is based on the types and quantities of land use within a traffic zone multiplied by a standard trip generation rate. The land use quantities could be acreage, square feet, number of employees, dwelling units, income levels or just about any quantity that has some form of trip generation rate associated with it. For this study, number of acres, number of dwelling units (DU), and number of students were used.

Trip generation rates were taken from *Trip Generation*, Third Edition, Institute of Transportation Engineers, and other sources. A summary of the trip generation rates is shown in Table 1.



VACAVILLE DRAFT GENERAL PLAN UPDATE

FIGURE 3 EXTERNAL CORDON STATION DISTRIBUTION PATTERN

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In general, trip generation for each zone is defined in terms of productions and attractions, where residential uses are typically trip producers and commercial and industrial uses are trip attractors. The existing land uses and quantities of each use are shown in Table III. Land use data was obtained from the City of Vacaville General Plan and collected by the City staff. The existing land use represents the number of dwelling units or acres that have occupied buildings on parcels that were constructed and occupied in January 1, 1987.

TABLE II

TRIP GENERATION RATES

LAND USE TYPE	PEAK HOUR TRIP GENERATION
Single-Family Residential	
High Income	1.8 TE/DU
Medium Income	1.1 TE/DU
Low Income	0.7 TE/DU
Medium-Density Residential	0.8 TE/DU
High-Density Residential	0.6 TE/DU
Resort Residential	0.3 TE/DU
Mobile Home Residential	0.5 TE/DU
Retirement Residential	0.4 TE/DU
Office	18.0 TE/ACRE
Light Industrial	10.1 TE/ACRE
General Industrial	6.0 TE/ACRE
General & Neighborhood Commercial	30.0 TE/ACRE
Downtown Commercial	60.0 TE/ACRE
Highway Commercial	35.0 TE/ACRE
Service Commercial	15.0 TE/ACRE
Public Offices & Civic Center	10.0 TE/ACRE
Park & Public Facilities	4.0 TE/ACRE
Elementary/Junior High School	0.10 TE/STUDENT
High School	0.20 TE/STUDENT
Open Space/Agricultural	0.05 TE/ACRE
Church & Hospitals	5.00 TE/ACRE

NOTES: TE = TRIP ENDS
DU = DWELLING UNITS

TABLE III

STUDY AREA LAND USE TOTALS BY LAND USE CATEGORY*

LAND USE TYPE	TOTAL EXISTING**
Single-Family Residential	11,124 DU
Medium-Density Residential	1,163 DU
High-Density Residential	3,912 DU
Mobile Home Residential	1,171 DU
Retirement Residential	1,227 DU
Office	28.8 ACRES
Light Industrial	214.8 ACRES
General Industrial	27.6 ACRES
General & Neighborhood Commercial	155.6 ACRES
Downtown Commercial	26.6 ACRES
Highway Commercial	64.9 ACRES
Service Commercial	76.9 ACRES
Public Offices & Civic Center	56.4 ACRES
Parks & Public Facilities	273.0 ACRES
Elementary/Junior High School	6,100 STU
High School	1,250 STU
Open Space/Agricultural	13,158 ACRES
Churches & Hospitals	29.4 ACRES

Notes: *The Land Use Type categories are for traffic generation purposes and do not corespond exactly to specific land use categories in the General Plan.
**The existing land use totals are from January 1, 1987.

Trip Distribution

To determine the interaction of travel within and between traffic zones and cordon stations the "MINUTP" system utilizes a standard gravity distribution model. In concept, the gravity model assumes that destinations requiring less travel time for a specific trip purpose have more attraction forces than alternative destinations that are further away but serve the same trip purpose. The strength of the attractive forces is a function of the size of the attraction and of the difference in travel time of competing destinations. The balancing of these trip productions and attractions within the study area and immediate region (as determined by external traffic at cordon station locations), determines the total net trip generation for the study area.

To calculate the distribution of traffic within and through the study area, several parameters needed to be provided to develop the traffic model. The first was to divide both production and attraction trips into three trip categories of home-work, home-other, and non-home based. Data on percentages of production trips in each of the home-based trip categories were derived from the *Transportation and Traffic Engineers Handbook*, Institute of Transportation Engineers (ITE). The second was to determine internal-internal/internal-external distribution for the three trip categories for both production and attraction trips.

Internal-internal trips are defined as trips that have both ends of a trip within the Vacaville study area. For example, a trip that is generated from a home in Vacaville to a job in Vacaville.

Internal-external trips are trips that have one end of the trip outside the Vacaville study area. Examples of these trip types include a person who lives in Vacaville but works outside of the study area, or someone who lives outside of the study area but drives to Vacaville to shop.

Table IV shows the internal-internal/internal-external production trip distribution for both existing and future condition models.

TABLE IV
PRODUCTION TRIP INTERNAL-INTERNAL/
INTERNAL-EXTERNAL DISTRIBUTION

TRIP PURPOSE	INTERNAL-INTERNAL	INTERNAL-EXTERNAL
Existing Condition Model		
Residential:		
Home-Work	60%	40%
Home-Other	85%	15%
Non-Residential:		
Non-Home Based	60%	40%
General Plan Build-out condition Model		
Residential:		
Home-Work	70%	30%
Home-Other	90%	10%
Non-Residential		
Non-Home Based	60%	40%

The internal-internal/internal-external distribution of attraction trips is related to the production trip distribution. The relationship is that the number of internal trips for each trip purpose for productions and attractions must be equal. Thus, once the production internal-internal/internal-external distribution and number of trips by each trip purpose is calculated, the attraction internal-internal/internal-external distribution is fixed because of this relationship. Table V presents the attraction internal-internal/internal-external trip distribution.

TABLE V
ATTRACTION TRIP INTERNAL-INTERNAL/
INTERNAL-EXTERNAL DISTRIBUTION

TRIP PURPOSE	INTERNAL-INTERNAL	INTERNAL-EXTERNAL
Existing Condition Model:		
Work (Ind./Office)	90%	10%
Other (Comml./School)	51%	49%
Non-Home Based	60%	40%
General Plan Build-out Condition Model:		
Work (Ind./Office)	35%	65%
Other (Comml./School)	34%	66%
Non-Home Based	60%	40%

Tables IV and V show the amount, in percentage, of residential (production) and commercial/industrial/office (attraction) trip generation that it likely to stay within Vacaville (internal-internal) and likely to leave Vacaville (internal-external).

In addition to determining the internal-internal/internal-external distributions, a directional distribution for trips entering or leaving the model study area were established. Using the total internal-internal/internal-external productions and attractions by trip category, trips were assigned to each external cordon based on its accessibility to residential, industrial and commercial land uses.

Table IV shows that as the General Plan land use goals are reached more residentially generated traffic (productions) will stay in Vacaville. Table V shows that because of a large amount of industrial/commercial/office growth that a high percentage of office, industrial and commercially generated traffic will have to come from outside of Vacaville to satisfy the demand for employees or shoppers.

Traffic Assignment

A capacity restraint methodology was used in assigning the traffic generated by the study area to the street network. Capacity restraint is a trip assignment methodology where traffic is assigned to the study area roadway network by increment. As various

facilities approach capacity, traffic is reassigned to less crowded facilities. This is done within the "MINUTP" model through the lowering of link speeds on facilities approaching capacity.

In Vacaville, the existing conditions model was run without the use of the capacity restraint part of the model and traffic was assigned to the network based on the shortest path from zone to zone. The capacities assumed for the roadways within this study are in Table VI. Figure 2 shows the existing roadway lane configuration and Figure 4 shows the existing p.m. peak hour volumes.

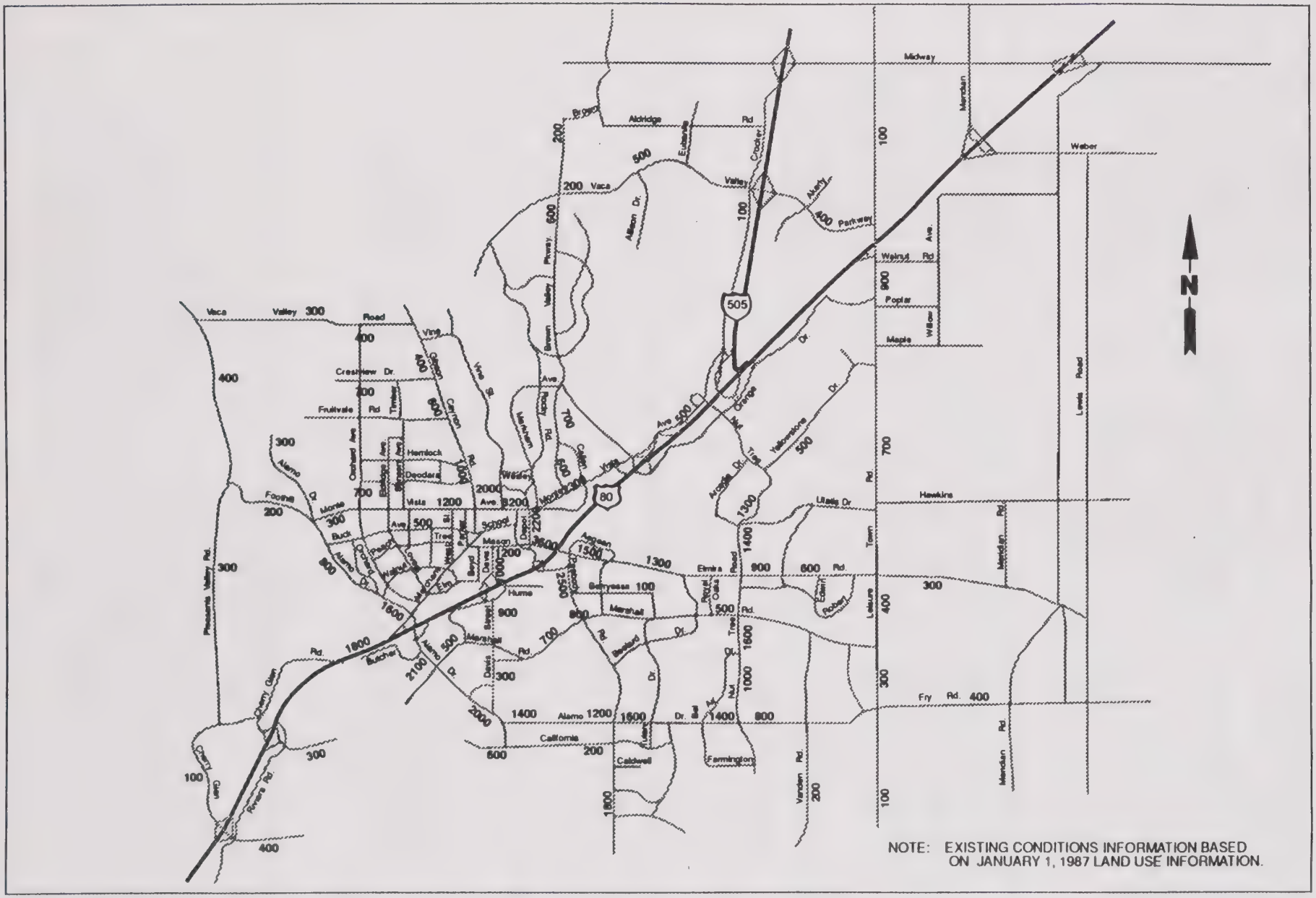
TABLE VI
ROADWAY CAPACITY BY CLASSIFICATION

	PEAK HOUR CAPACITY		
ROADWAY TYPE	**LOS C**	**LOS E**	**PER LANE**
Eight-Lane Freeway	12,000	16,000	2,000
Six-Lane Freeway	8,000	12,000	2,000
Six-Lane Divided Arterial	4,500	6,900	1,150
Four-Lane Divided Arterial	3,500	4,500	1,150
Four-Lane Undivided Arterial	2,500	3,300	830
Two-Lane Arterial	1,500	1,660	830
Two-Lane Collector	1,000	1,400	700
Two-Lane Residential	750	1,000	500

NOTE:
LOS = Level of Service (see "Definition of Technical Terms" for description.)

It was assumed that a two-lane arterial is a street that has no residential frontage, limits access, and has left-turn pockets at major intersections.

Through traffic, as defined earlier, was also included in the assignment of traffic to the roadway network. Future through traffic was determined from the current growth rate on freeways and state highways (Caltrans).



NOTE: EXISTING CONDITIONS INFORMATION BASED ON JANUARY 1, 1987 LAND USE INFORMATION.

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FIGURE 4 EXISTING P.M. PEAK HOUR VOLUMES

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Analysis Model

An existing conditions model, used to calibrate the traffic model assumptions, was developed in this study to finalize assumptions used in the future model. The model is calibrated by adjusting trip generation rates, trip distribution rates, and roadway network capacities and speeds until the model traffic projections are similar to those existing in the study area roadway network.

Variations in the existing traffic counts due to factors such as time of year and day of the week will make calibration of the model more difficult. A value of 5 to 10 percent variance between actual and calculated traffic volumes is used as a target value. In some cases, due to variables in human behavior or non-typical land uses, the target values cannot be obtained. In calibrating the existing conditions model, about 90 percent of the projected traffic volumes, at locations where traffic counts available, were within 5 to 10 percent of the actual peak hour field counts. This shows that the existing conditions model is calibrated correctly and is reasonably accurate in simulating existing field conditions.

The future conditions model used trip generation rates and trip distribution patterns developed in the calibration model and projected land uses in the study area.

Other Transportation Modes

Currently, the individual motor vehicle is the main form of transportation in Vacaville. However, other modes such as transit, bicycle, and waking, could provide some relief to future traffic levels if they provide a safe and quick alternative to the private automobile.

Transportation Systems Management (TSM)

Transportation Systems Management (TSM) measures are designed to reduce the number of vehicle trips during congested periods. Usually, TSM measures are used when the capacity of a street network cannot be physically increased, the practical limit of capacity has already been met, or the cost of providing additional capacity is prohibitive. Examples of TSM programs include ridesharing (e.g., carpooling, vanpooling, buspooling), alternative work hours, public transit, and parking

management. Other forms of TSM are also available. They include traffic operation improvements (e.g., channelization, signalization, computerized traffic control, ramp metering, reversible traffic lanes), preferential treatment for high occupancy vehicles (e.g., exclusive lanes, priority lanes, signal pre-emption), and non-motorized modes (e.g., bicycle lanes, pedestrian malls). By using TSM methods of reducing congestion, significant reductions in peak hour trips can be achieved.

Transit: There is a current Citywide bus system in the City. A majority of the ridership in the system are persons that do not have access to an automobile. With future industrial growth in the northeast section of the city, a safe and quick transit system serving the residents of the City that would work in the industrial areas could capture a number of vehicular trips. To this end the City is planning to do a study of the City's future transit needs.

Bicycles: Future bicycle facilities are addressed in the City Master Plan Circulation Element. In general, it provides for bicycle lanes on all major roadway facilities.

Pedestrian: Future pedestrian facilities are provided for through the inclusion of sidewalks on all streets and crosswalks at major intersections.

Given the magnitude of projected traffic congestion on several roadways in the City of Vacaville, it is recommended that TSM measures be applied throughout the City as an effective means of reducing congestion. There are three types of TSM measures that may be used alone or in some combination. These are: voluntary measures to decrease vehicle trips, such as ridesharing and staggered work hours; pricing mechanisms, such as parking surcharges; and physical and operational restraints, such as complete or partial street closures, intersection modifications, and traffic signals.

Based on data available in other cities implementing TSM programs (i.e., Pleasanton, Roseville, Sacramento), a reduction in trips was assumed in developing the Vacaville model. For home-to-work trips, or for major employment areas in Vacaville, a 30 percent reduction in p.m. peak-hour trips was assumed. The model assumed the 30 percent trip reduction in the large employment areas including Vaca Valley Industrial Park, Vaca Valley Corporate Center, Oates Industrial Park, Lagoon Valley Business Park. For home-other and non-home based trips, a reduction of 2 percent was assumed.

CHAPTER 3

GENERAL PLAN BUILD-OUT
TRAFFIC MODEL RESULTS AND RECOMMENDATIONS

This chapter presents the results of the General Plan Update traffic model. Future roadway requirements and needs for new facilities are discussed. The analysis includes recommendations for intersection lane geometrics. For the study intersections, future lane configurations were assumed to be the same as those presented in the study entitled *Updated Citywide Transportation Study for the City of Vacaville* dated August 15, 1989. The new volumes generated from the update of General Plan land uses were applied to the existing General Plan roadway network. As a result of increased land use generating higher volumes, some additional lanes were required. Additional mitigation from the existing General Plan base is indicated where appropriate.

Future Land Uses

The Vacaville General Plan Update was used as a guide in determining future land uses in the study area. The City Planning Division determined General Plan build out, land use acreages, dwelling units, and number of students.

Table VII shows the total uses for each land use category used in the General Plan model. From the table it can be seen that at General Plan Build-out the number of residential units in the City will increase 1.25 times, while commercial acreage will increase 4.0 times above the existing acreage level. Industrial and office acreage will grow the most in the next 20 years. Total acreage will increase 6.8 times.

The majority of the new residential growth in the City of Vacaville is expected in the south and east sections of the City, with industrial and commercial growth in the northeast section.

Future Roadway Network

The roadway network used in the General Plan Build-out analysis was determined from the City Circulation Element and input from the City's Public Works Department staff. Figure 5 shows the assumed future roadway network.

TABLE VII

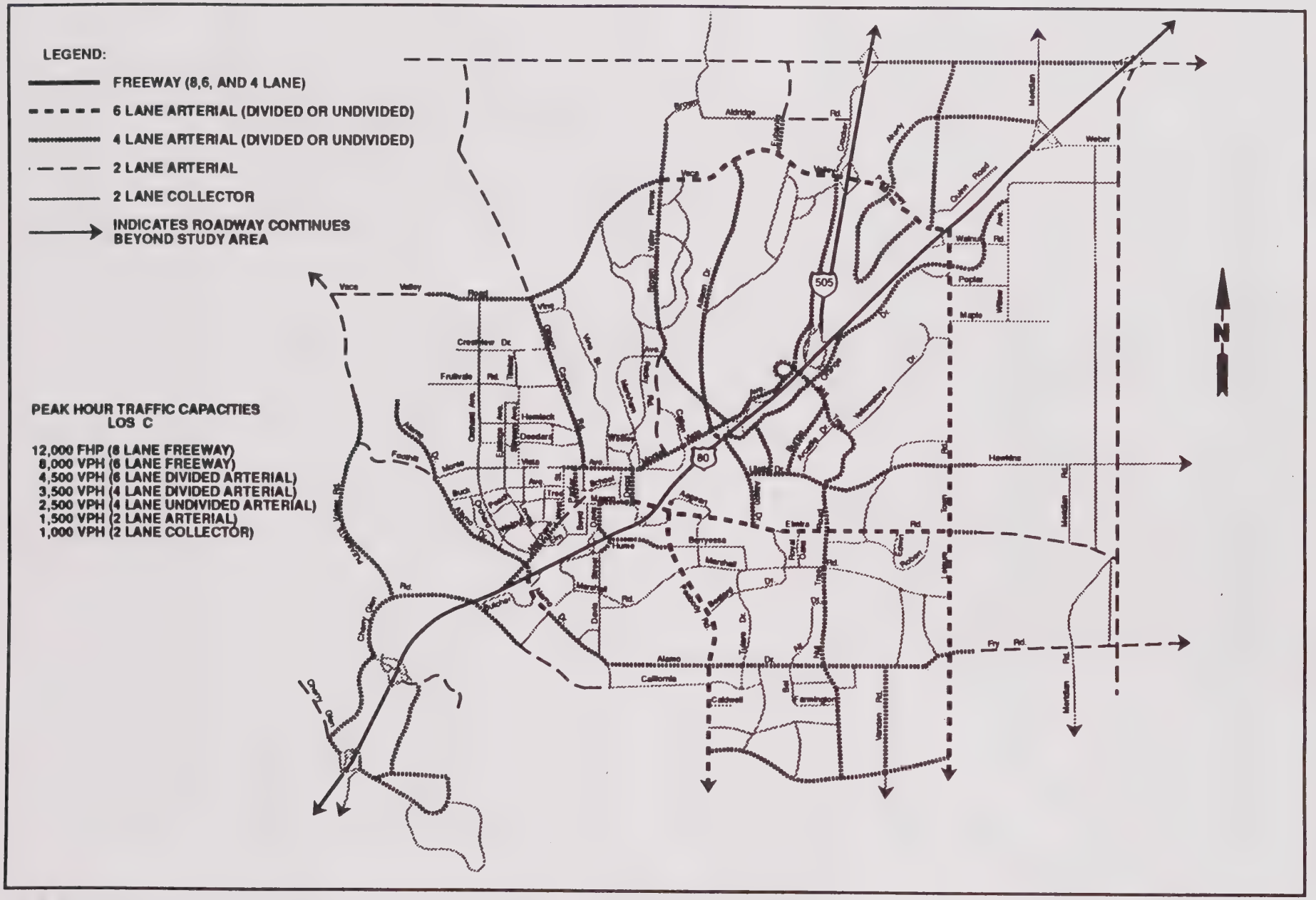
STUDY AREA LAND USE TOTALS BY LAND USE CATEGORY*

LAND USE TYPE	TOTAL EXISTING**	TOTAL PROJECTED***
Single-Family Residential	11,124 DU	26,995 DU
Medium-Density Residential	1,163 DU	3,949 DU
High-Density Residential	3,912 DU	7,434 DU
Mobile Home Residential	1,171 DU	1,772 DU
Resort Residential		60 DU
Retirement Residential	1,227 DU	1,715 DU
Office	28.8 ACRES	281.6 ACRES
Light Industrial	214.8 ACRES	1,403.7 ACRES
General Industrial	27.6 ACRES	422 ACRES
General & Neighborhood Commercial	155.6 ACRES	838.5 ACRES
Downtown Commercial	26.6 ACRES	44.2 ACRES
Highway Commercial	64.9 ACRES	686.7 ACRES
Service Commercial	76.9 ACRES	106.5 ACRES
Public Offices & Civic Center	56.4 ACRES	262.9 ACRES
Parks & Public Facilities	273.0 ACRES	844.9 ACRES
Elementary/Junior High School	6,100 STU	21,300 STU
High School	1,250 STU	6,100 STU
Open Space/Agricultural	13,158 ACRES	5,668 ACRES
Churches/Hospitals	29.4 ACRES	1,028 ACRES
Private Recreation		898.9 ACRES

Notes: *The land use categories are for traffic generation purposes and do not correspond exactly to specific land use categories in the General Plan.

**The existing land use totals are from January 1, 1987.

***The projected land use totals are at buildout of the proposed General Plan.



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FIGURE 5 RECOMMENDED FUTURE ROADWAYS BY TYPE

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Model Results

Using the General Plan Build-out land uses, projected improvements and additions to the existing roadway network and variables determined from the model calibration process, future peak hour traffic volumes were projected.

To analyze the future roadway network needs, a two-stage process was used: first, calculation of overall Citywide network link needs, that is sizing of existing and future facilities based on projected traffic volumes; and second, sizing of critical intersections based on projected turning movements. Both stages are necessary to evaluate future roadway needs in the City. Link-only road sizing ignores possible additional lane needs at intersections and intersection-only sizing would have a tendency to cause an over sizing of link network facilities.

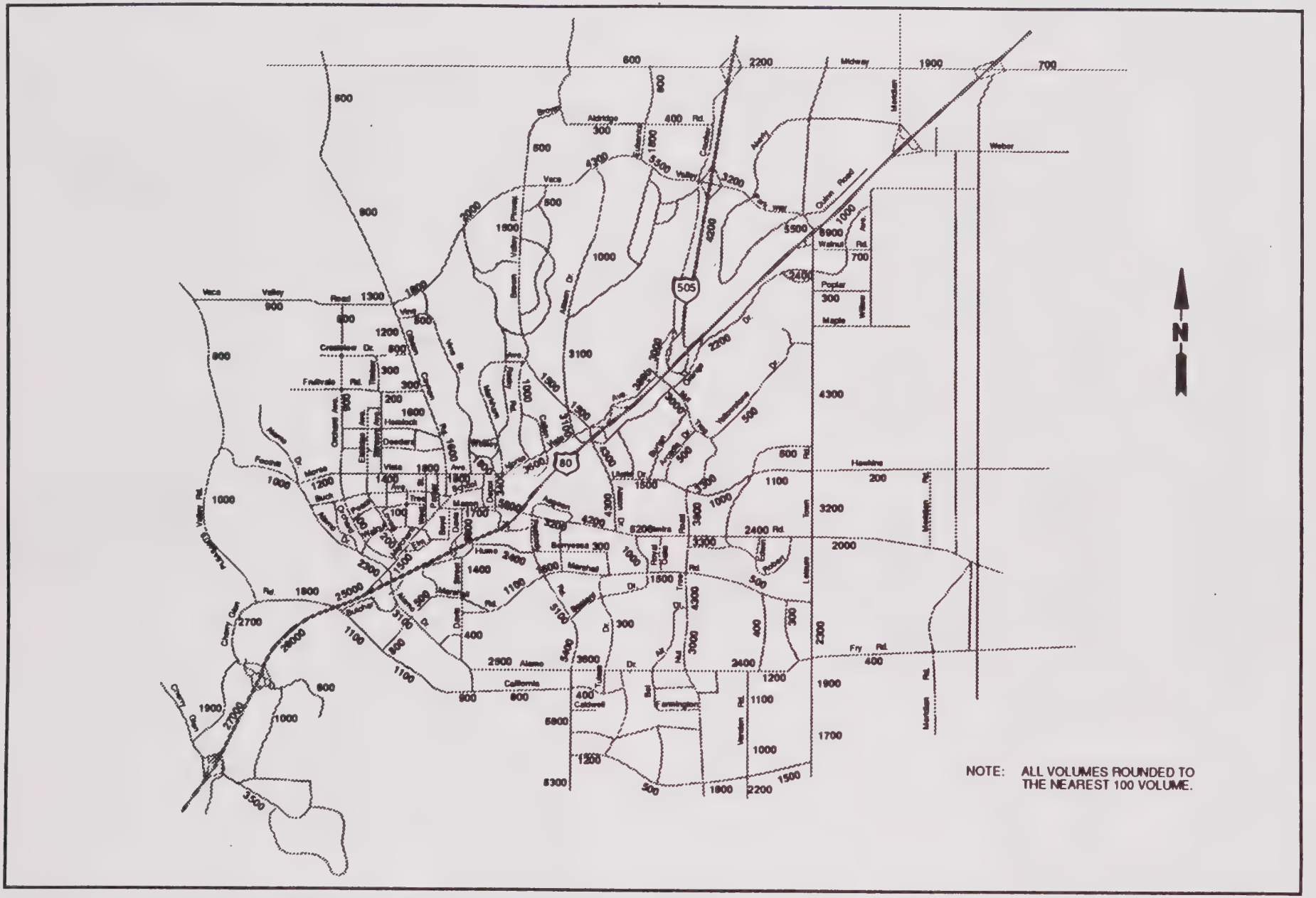
Link Network Analysis

Projected traffic volumes for the General Plan Build-out with the assumed future roadway network are shown on Figure 6. The traffic volumes are for the p.m. peak hour.

Heavily impacted areas, shown in Figure 7, would be the areas around the Interstate 80/Leisure Town Road, and Interstate 80/Peabody Road. All or portions of Peabody Road, Leisure Town Road, East Monte Vista Avenue, Orange Drive, Nut Tree Road, Vaca Valley Parkway east of Browns Valley Road, Allison Drive, and Elmira Road/Mason Street west of Nut Tree Road are heavily impacted arterials.

Recommended network improvements are shown on Figure 8 and described in Table VIII. The recommendations are based on Level of Service C capacities shown in Table VI and projected traffic volumes shown in Figure 6.

Level of Service C was selected as the level of service to size future facilities. This was due to the long-range planning nature of this analysis. Level of Service C allows for future growth unforeseen by this report with an adequate comfort zone before the roadway facilities approach capacity. To do long-term planning, Level of Service D would not allow for future growth beyond the levels assumed in this analysis or changes in existing travel patterns.



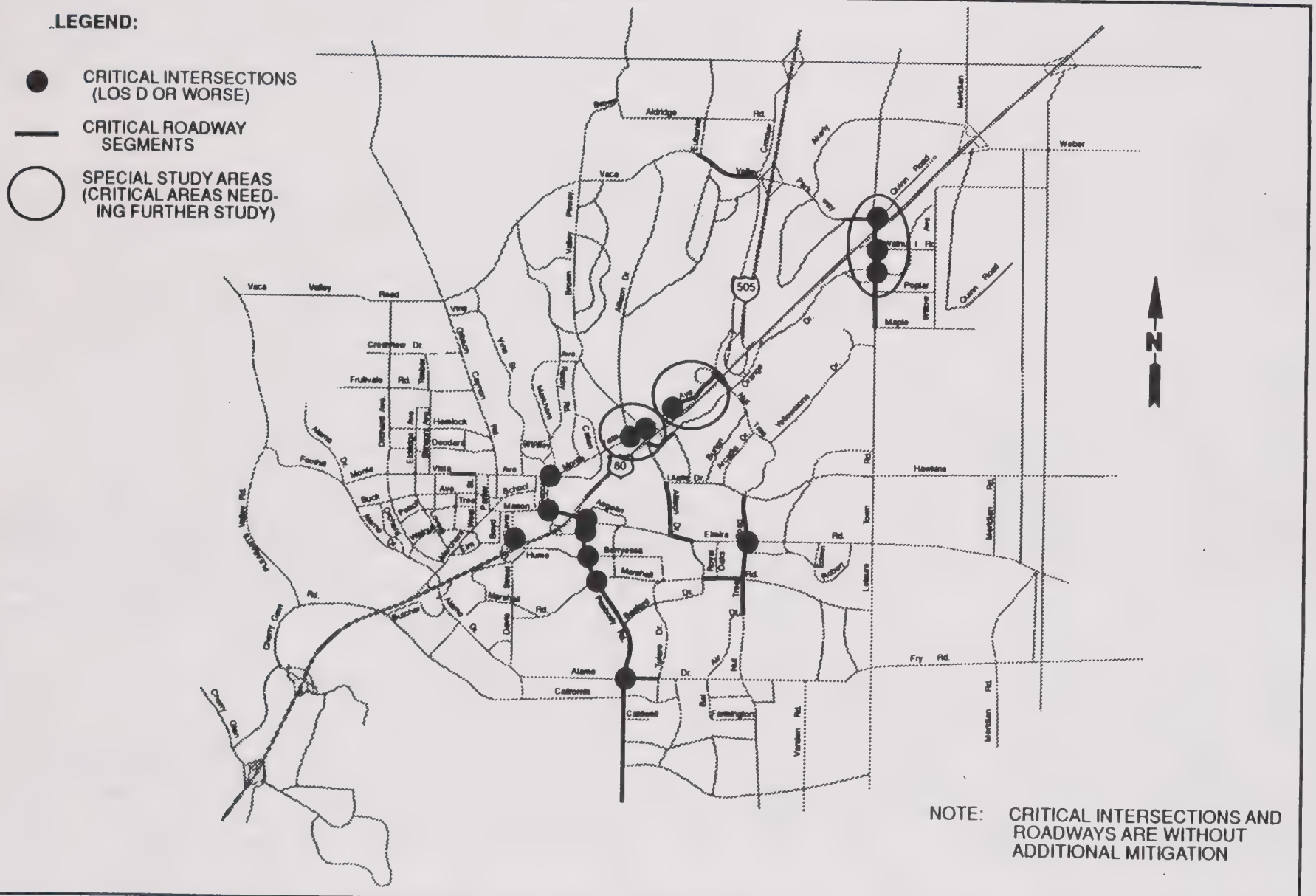
VACAVILLE DRAFT GENERAL PLAN UPDATE

FIGURE 6 PROJECTED P.M. PEAK HOUR VOLUMES

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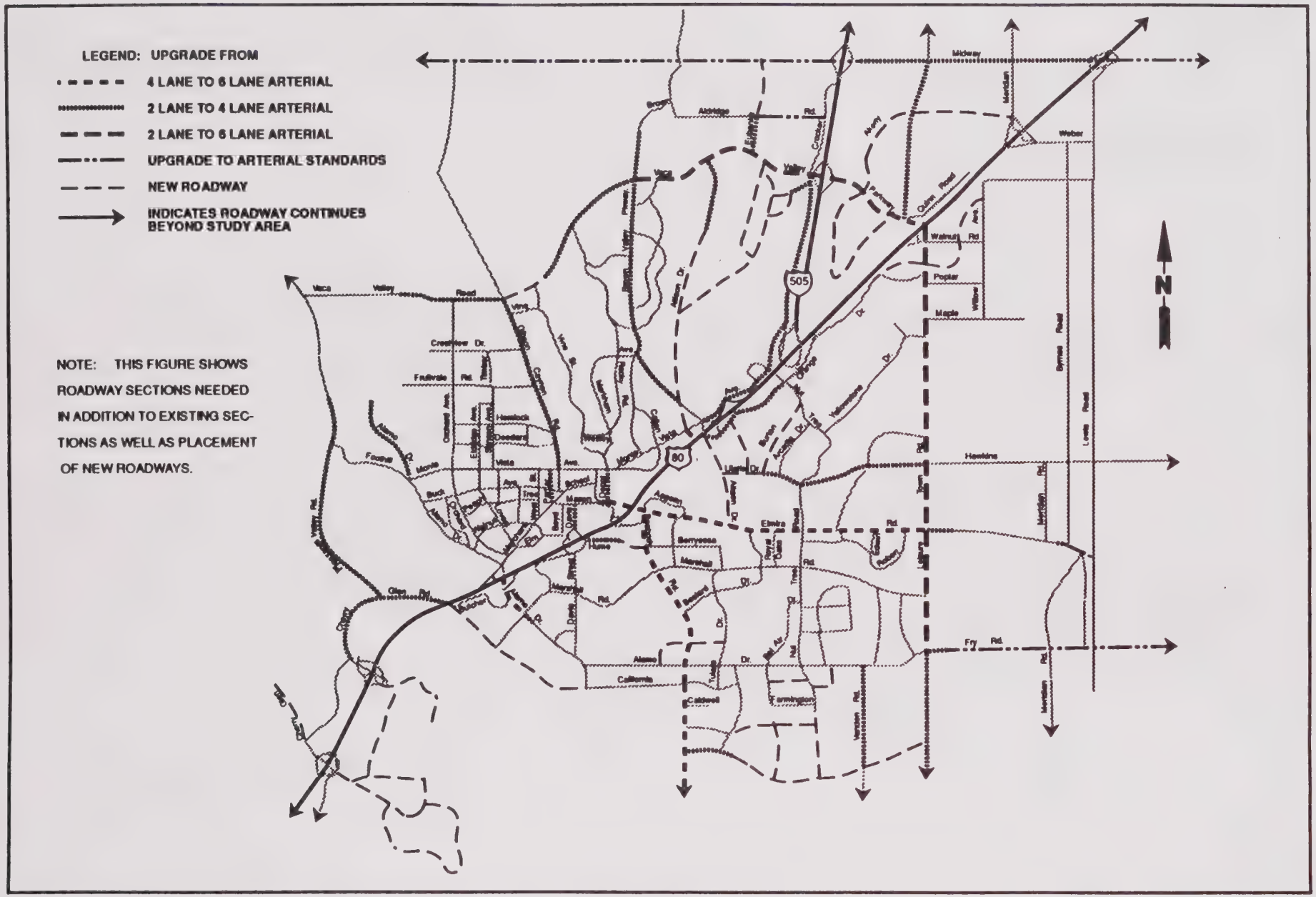
VACAVILLE DRAFT GENERAL PLAN UPDATE

FIGURE 7 LOCATION OF CRITICAL INTERSECTIONS AND ROADWAYS

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VACAVILLE DRAFT GENERAL PLAN UPDATE

FIGURE 8 MAJOR ROADWAY IMPROVEMENTS

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TABLE VIII. RECOMMENDED ROADWAY IMPROVEMENTS

ROADWAY	BETWEEN	IMPROVEMENT
Midway Road	Gibson Canyon Road and I-505; east of I-80	Upgrade from two-lane collector to two lane arterial
	I-505 and I-80	Widen from two to four lanes
Leisure Town Road	City Limits and I-80; Alamo Drive and City Limits	Widen from two to four lanes
	I-80 and Alamo Drive	Widen from two to six lanes
Peabody Road	Elmira Road and City Limits	Widen from four to six lanes
Nut Tree Parkway	Nut Tree Road and Allison Drive	Widen from two to four lanes
Pleasants Valley Road	Alamo Creek and Cherry Glen Road	Widen from two to four lanes
Alamo Drive	I-80 and Marshall Road	Widen from four to six lanes
Gibson Canyon Road	Vaca Valley Parkway and Deodara Avenue	Widen from two to four lanes
Depot Street	Mason Street and Monte Vista Avenue	Widen for additional capacity
Browns Valley Parkway	Allison Drive and north of McMurtrey Lane	Widen from two to four lanes
E. Monte Vista Avenue	Browns Valley Parkway and Vaca Valley Parkway	Widen from two to four lanes
Allison Drive	Vaca Valley Parkway and E. Monte Vista Avenue	Widen from two to four lanes
Eubanks Drive	Vaca Valley Parkway and Aldridge Road	Widen from two to four lanes

TABLE VIII. RECOMMENDED ROADWAY IMPROVEMENTS

ROADWAY	BETWEEN	IMPROVEMENT
Vaca Valley Parkway	west of Orchard Avenue and Browns Valley Parkway	Widen from two to four lanes (and new four lane arterial where it does not yet exist)
	Browns Valley Parkway and I-80	Widen from two to six lanes
Orange Drive	Nut Tree Road and Leisure Town Drive	Widen from two to four lanes
	Its current terminus and west of Willow Avenue	Four lane arterial
Ulatis Drive	Nut Tree Road and Leisure Town Road	Widen from two to four lanes
	Allison Drive and Nut Tree Road	Four lane arterial
Mason Street/Elmira Road	Davis Street and Leisure Town Road	Widen from four to six lanes
	East of Leisure Town Road	Widen for two to four lanes
Fry Road	East of Leisure Town Road	Upgrade from two-lane collector to four-lane arterial
Cherry Glen Road	I-80 and California Drive	Widen from two to four lanes
Davis Street	Mason Street and Hume Way	Widen from two to four lanes
Eubanks Drive	Aldridge Road and Midway Road	Two lane arterial
Allison Drive	Monte Vista Avenue and Nut Tree Parkway	Six lane arterial
	Nut Tree Parkway and Elmira Road	Four lane arterial

TABLE VIII. RECOMMENDED ROADWAY IMPROVEMENTS

ROADWAY	BETWEEN	IMPROVEMENT
Akerly Loop	Connecting Meridian, Leisure Town Road and Vaca Valley Parkway	Four lane arterial
Burton Avenue	Ulatis Drive and Nut Tree Road	Four lane arterial
Hume Way	Davis Street and Peabody Road	Four lane arterial
California Drive	Peabody Road and Marshall Road	Two lane arterial
	Marshall Road and Pleasants Valley Road	Four lane arterial
Various roadways in the southeast sector and Lagoon Valley sector	---	Two and four lanes

Corresponds to Figure 6.3.

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The recommendations in this study should be used to reserve right-of-way in areas where development is starting or redevelopment is occurring.

The level of service classification system is a scale which ranks street, highway, and intersection operations based on the amount of traffic and traffic operations. A complete description of the system is included in the *Highway Capacity Manual* (Special Report 209) Highway Research Board, 1985. Briefly, the level of service ranking system is a scale with a range of A through F. Level A represents free-flow conditions and Level F represents jammed or capacity conditions.

In some areas, there is not enough right-of-way or pavement width to accommodate the number of lanes recommended in Figure 5 using the City standard roadway cross-sections. In those cases, it may be necessary to create non-standard cross-sections to accommodate the necessary lanes. To improve capacity on the City standard four-lane divided arterial section, on-street parking should be prohibited and driveway and street access be limited (especially at intersections). These recommendations are already in use on Nut Tree Road between Elmira Road and Alamo Drive and can add up to a 20 percent increase in capacity for a roadway. These improvements would increase the capacity (LOS C) of a four-lane divided arterial to 4,200 vehicles per hour.

Intersection Analysis

To further determine future roadway needs, a detailed analysis was conducted at 39 identified critical or major intersections. Figure 9 shows the location of the critical study intersections.

To evaluate the future lane geometrics at each of the critical intersections, a capacity analysis was conducted. The traffic volumes used in the analysis were taken from the existing conditions and General Plan Build-out conditions traffic model. The actual existing (1989) level of service may vary from that shown in Table IX (which represents 1987), but are shown to demonstrate improvments from "existing" LOS D



VACAVILLE DRAFT GENERAL PLAN UPDATE

FIGURE 9 LOCATION OF STUDY INTERSECTIONS

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to projected buildout intersection operations. A Level of Service C criteria and maximum approach lane configuration of two left-turn lanes, three through lanes, and a right-turn lane were used as guidelines to aid in the design of each intersection. At some intersections there were existing land use constraints that were considered in the intersection design; thus, it was not feasible to obtain Level of Service C.

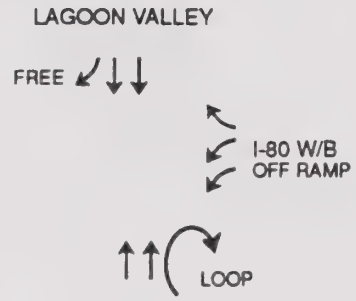
The critical movement summation method of capacity analysis was used in this report. This method involves consideration of "critical" (or high volume) conflicting movements and is based on information from a number of sources including *Highway Capacity Manual*, Special Report 209, Transportation Research Board, 1985.

The volume-to-capacity (V/C) ratio is an indication of the level of service (LOS) at which an intersection is operating. The level of service classification system is a scale which ranks street, highway, and intersection operations based on the amount of traffic and traffic operations. A complete description of the system is included in the *Highway Capacity Manual* (Special Report 209) Highway Research Board, 1985. Briefly, the level of service ranking system is a scale with a range of A through F. Level A represents free flow conditions and level F represents jammed or capacity conditions.

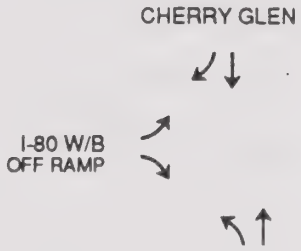
Table IX shows the projected level of service at all 39 critical study intersections for General Plan Build-out conditions as determined by the model. The recommended lane configurations for these intersections are shown schematically in Figure 10.1 through 10.6. Buildout volumes were first analyzed using currently approved and adopted intersection geometrics taken from the *Updated Citywide Transportation Study for the City of Vacaville* dated August 15, 1989. The intersection capacity results for the updated traffic volumes with currently approved future geometrics are shown in Column 2 of Table IX. Because of increased volumes, some intersection required additional mitigation. The additional mitigation is indicated by bolded arrows on the affected intersection drawing. Mitigated intersection capacity calculations are shown in Column 3 of Table IX.

It is recommended that the results of this analysis be used to obtain or reserve the necessary right-of-way for the improvements recommended. Actual intersection design should be done using detailed field counts and observing actual traffic patterns before implementation. For all arterial-to-arterial intersections and other

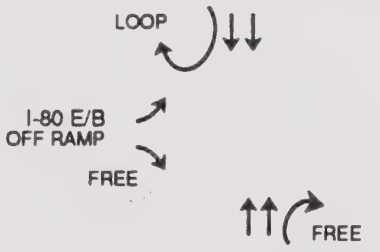
LAGOON VALLEY & I-80 WESTBOUND



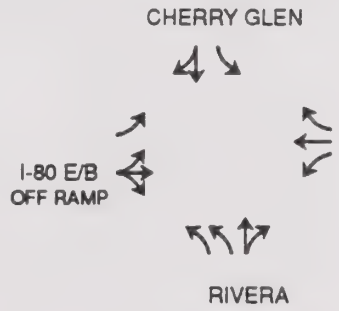
CHERRY GLEN & I-80 WESTBOUND



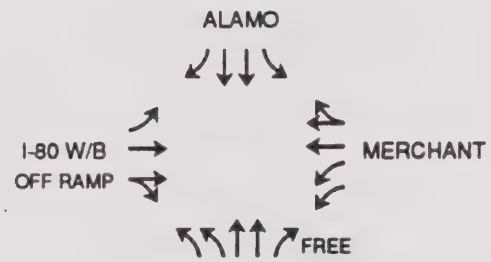
LAGOON VALLEY & I-80 EASTBOUND



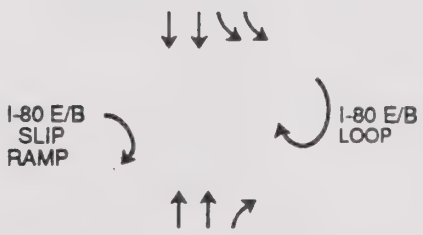
CHERRY GLEN & I-80 EASTBOUND



ALAMO & I-80 WESTBOUND



ALAMO & I-80 EASTBOUND



NOTE: BOLDED ARROWS INDICATE MITIGATION REQUIRED ABOVE AND BEYOND THAT RECOMMENDED IN THE UPDATED CITYWIDE TRANSPORTATION STUDY FOR THE CITY OF VACAVILLE DATED AUGUST 15, 1989.

VACAVILLE DRAFT GENERAL PLAN

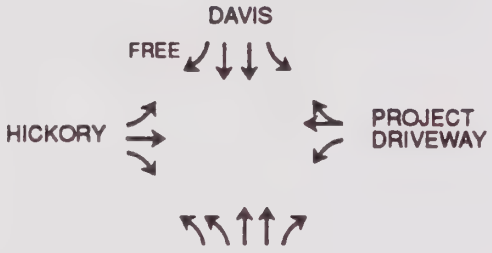
FIGURE 10.1 INTERSECTION AND INTERCHANGE IMPROVEMENTS

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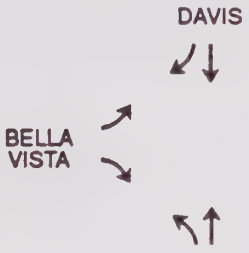
JKM

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DAVIS & I-80



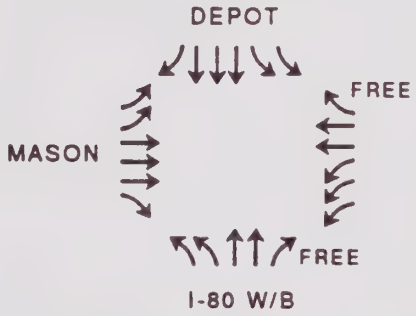
DAVIS & BELLA VISTA



DAVIS & HUME

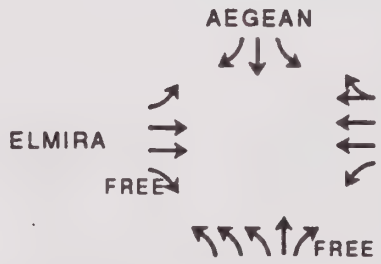


MASON & DEPOT



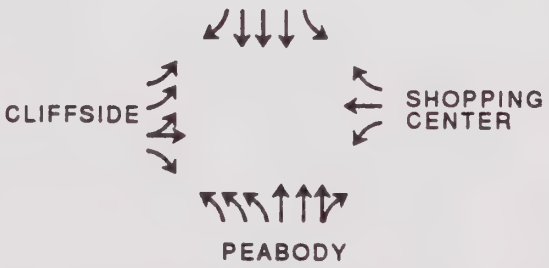
WITHOUT ADDITIONAL LANES, OR OTHER MITIGATION, THIS INTERSECTION WILL OPERATE AT LOS F.

ELMIRA & AEGEAN



PROJECTED TO OPERATE AT LOS D WITHOUT THE PROPOSED TRIPLE LEFT-TURN LANE

PEABODY & CLIFFSIDE



WITHOUT ADDITIONAL LANES, INTERSECTION IS PROJECTED TO OPERATE AT LOS F. WITH ADDITIONAL LANES, LOS D.

NOTE: BOLDED ARROWS INDICATE MITIGATION REQUIRED ABOVE AND BEYOND THAT RECOMMENDED IN THE UPDATED CITYWIDE TRANSPORTATION STUDY FOR THE CITY OF VACAVILLE DATED AUGUST 15, 1989.

VACAVILLE DRAFT GENERAL PLAN

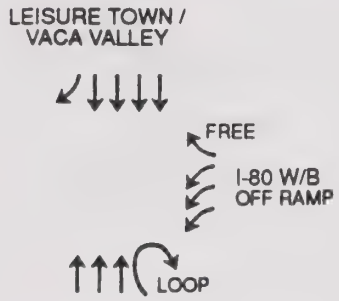
FIGURE 10.2 INTERSECTION AND INTERCHANGE IMPROVEMENTS

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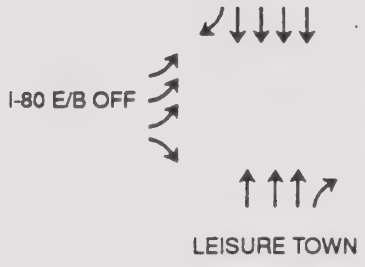
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LEISURE TOWN & I-80 WESTBOUND *



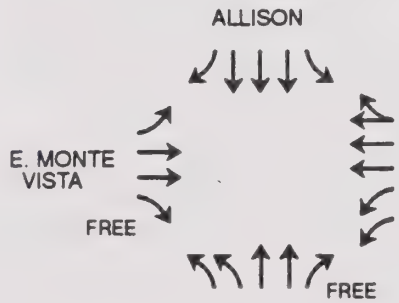
*SPECIAL STUDY AREA

LEISURE TOWN & I-80 EASTBOUND *



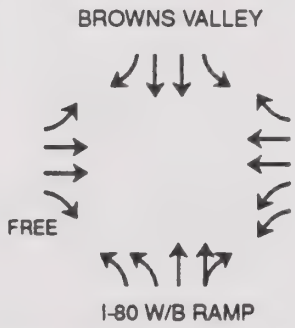
*SPECIAL STUDY AREA

ALLISON & E. MONTE VISTA *



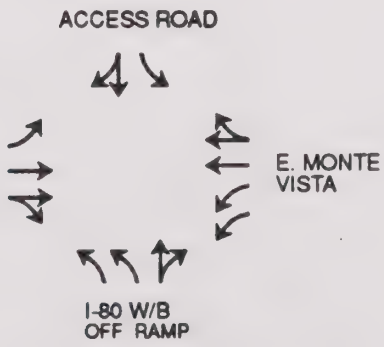
*SPECIAL STUDY AREA

BROWNS VALLEY & E. MONTE VISTA *



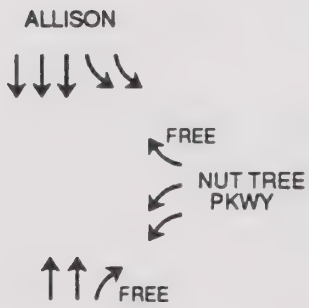
*SPECIAL STUDY AREA

I-80 WESTBOUND & E. MONTE VISTA *



* SPECIAL STUDY AREA

ALLISON & NUT TREE *



*SPECIAL STUDY AREA

VACAVILLE DRAFT GENERAL PLAN

FIGURE 10.3 INTERSECTION AND INTERCHANGE IMPROVEMENTS

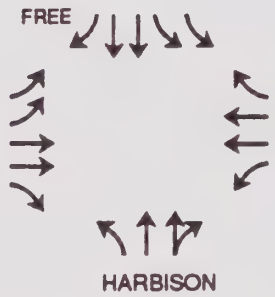
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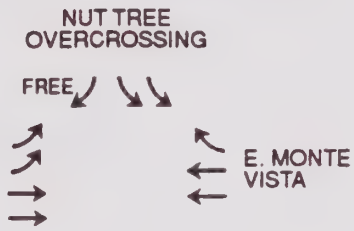
*SPECIAL STUDY AREAS ARE DISCUSSED ON PAGE 21.

HARBISON & NUT TREE *



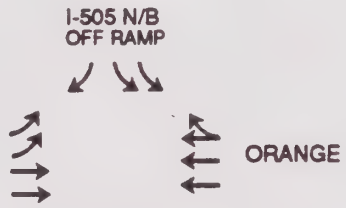
*SPECIAL STUDY AREA

NUT TREE OVERCROSSING & E. MONTE VISTA *

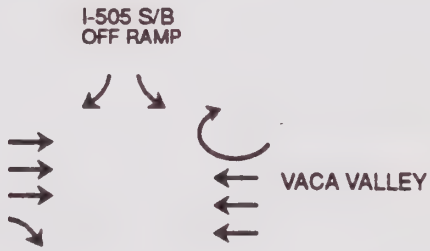


*SPECIAL STUDY AREA

ORANGE & I-505 N/B



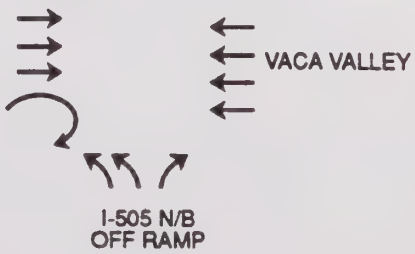
VACA VALLEY & I-505 SOUTHBOUND



MIDWAY & I-505 SOUTHBOUND



VACA VALLEY & I-505 NORTHBOUND



VACAVILLE DRAFT GENERAL PLAN

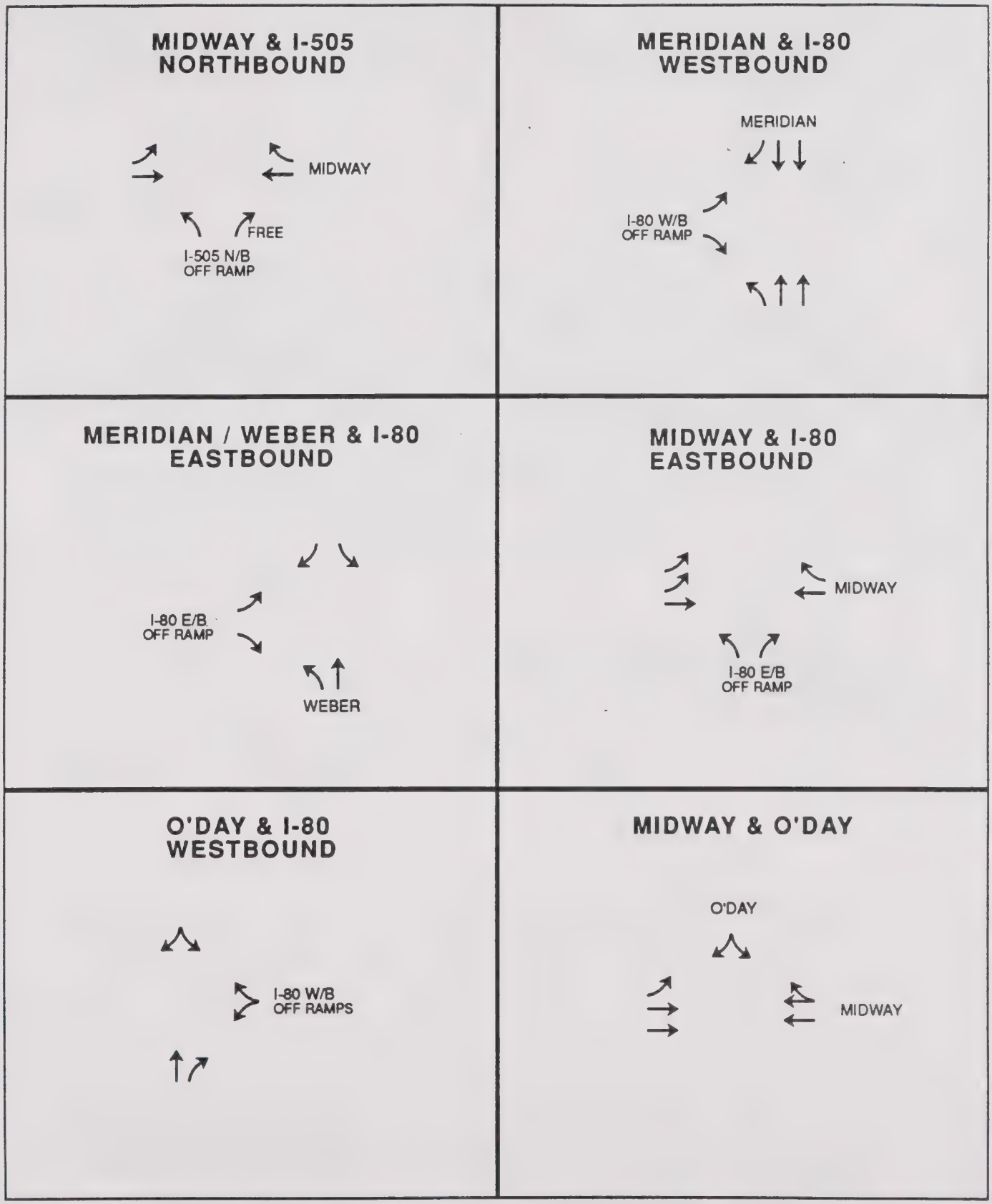
FIGURE 10.4 INTERSECTION AND INTERCHANGE IMPROVEMENTS

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*SPECIAL STUDY AREAS ARE DISCUSSED ON PAGE 21.



VACAVILLE DRAFT GENERAL PLAN

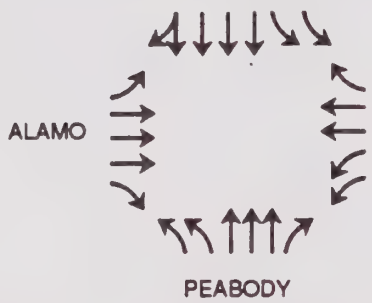
FIGURE 10.5 INTERSECTION AND INTERCHANGE IMPROVEMENTS

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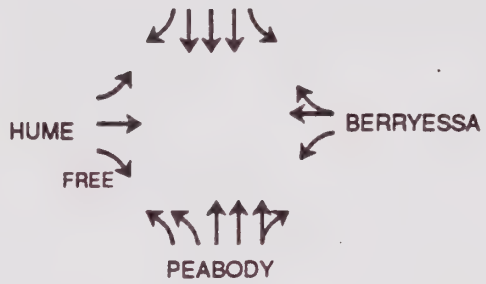
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PEABODY & ALAMO



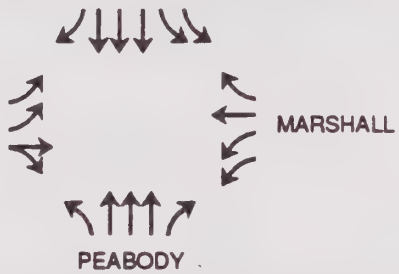
PROJECTED TO OPERATE AT LOS D WITH MITIGATION; LOS F WITHOUT MITIGATION

PEABODY & HUME



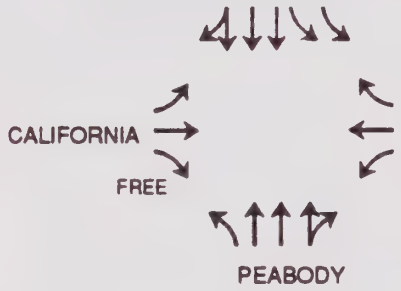
PROJECTED TO OPERATE AT LOS E

PEABODY & MARSHALL

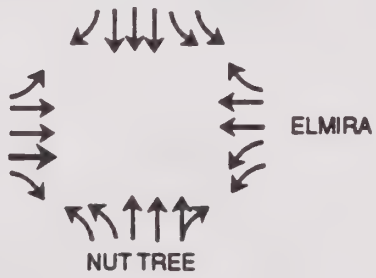


REQUIRES SUBSTANTIAL RIGHT-OF--WAY ACQUISITION. WILL OPERATE AT LOS C WITH MITIGATION; LOS F WITHOUT MITIGATION.

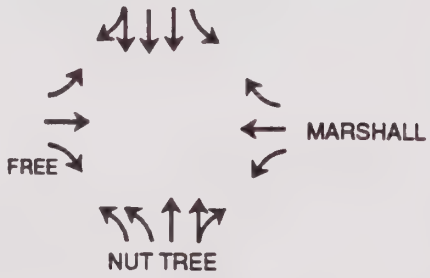
PEABODY & CALIFORNIA



NUT TREE & ELMIRA



NUT TREE & MARSHALL



NOTE: BOLDED ARROWS INDICATE MITIGATION REQUIRED ABOVE AND BEYOND THAT RECOMMENDED IN THE UPDATED CITYWIDE TRANSPORTATION STUDY FOR THE CITY OF VACAVILLE DATED AUGUST 15, 1989.

VACAVILLE DRAFT GENERAL PLAN

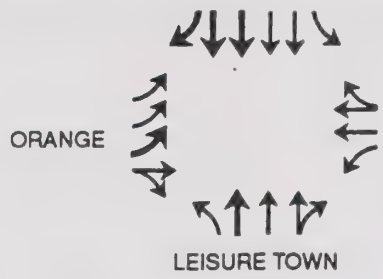
FIGURE 10.6 INTERSECTION AND INTERCHANGE IMPROVEMENTS

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TJKM

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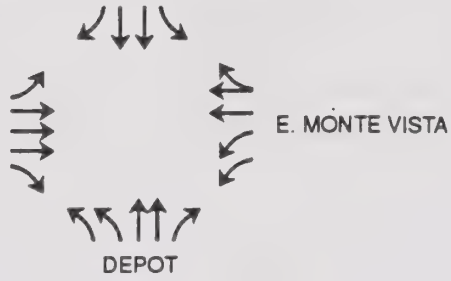
LEISURE TOWN & ORANGE *



* SPECIAL STUDY AREA

PROJECTED TO OPERATE AT LOS D WITH MITIGATION; LOS F WITHOUT MITAGATION.

DEPOT & E. MONTE VISTA



REQUIRES SUBSTANTIAL ROW THAT MAY NOT ECONOMICALLY OR PRACTICALLY BE FEASIBLE. PROJECTED TO OPERATE AT LOS E.

NOTE: BOLDED ARROWS INDICATE MITIGATION REQUIRED ABOVE AND BEYOND THAT RECOMMENDED IN THE UPDATED CITYWIDE TRANSPORTATION STUDY FOR THE CITY OF VACAVILLE DATED AUGUST 15, 1989.

*SPECIAL STUDY AREAS ARE DISCUSSED ON PAGE 21.

VACAVILLE DRAFT GENERAL PLAN

FIGURE 10.7 INTERSECTION AND INTERCHANGE IMPROVEMENTS

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56-065

TABLE IX. INTERSECTION LEVEL OF SERVICE

	Existing 1987		Draft General Plan*		Draft General Plan (Mitigated)	
	V/C	LOS	V/C	LOS	V/C	LOS
Lagoon Valley & I-80 W/B			0.33	A		
Lagoon Valley & I-80 E/B			0.65	B		
Cherry Glen & I-80 W/B			0.59	A		
Cherry Glen & I-80 E/B			0.74	C		
Alamo & Merchant	0.93	E	0.52	A		
Alamo & I-80 E/B	0.79	C	0.48	A		
Davis & I-80 W/B (Hickory)	0.67	B	1.00	F	0.72	C
Bella Vista & Davis	0.35	A	0.55	A	0.55	A
Davis & Hume			0.69	B	0.69	B
Depot & Mason	1.00	F	1.17	F	0.96	E
Mason and Peabody	0.84	D	0.83	D	0.72	C
Peabody & Cliffside	0.85	D	1.14	F	0.86	D
Allison & E. Monte Vista			0.77	C	0.77	C
Browns Valley & E. Monte Vista	0.39	A	1.15	F	0.83	D
E. Monte Vista & I-80 W/B	0.39	A	0.91	E		
Harbison & Nut Tree Parkway [New Ramps]			1.10	F	[0.67]	[B]
Nut Tree & E. Monte Vista			0.65	B	0.77	C
Orange & I-505 N/B			0.78	C	0.78	C
Orange & I-80 W/B			0.62	B	0.62	B
Leisure Town & I-80 W/B	0.27	A	1.40	F	0.79	C
Leisure Town & I-80 E/B	0.55	A	1.04	F	0.75	C
Vaca Valley & I-505 N/B	0.20	A	0.63	B		
Vaca Valley & I-505 S/B	0.15	A	0.76	C		
Midway & I-505 N/B			0.38	A		
Midway & I-505 S/B			0.47	A		
Midway & I-80 W/B			0.62	B		
Midway & I-80 E/B			0.72	C		
Meridian & I-80 W/B			0.79	C		
Meridian & I-80 E/B			0.48	A		
Peabody & Alamo	0.60	A	1.06	F	0.86	D
Peabody & Marshall	0.64	B	1.01	F	0.80	C
Peabody & California			0.77	C		
Nut Tree & Elmira	0.54	A	0.84	D	0.75	C
Nut Tree & Marshall	0.49	A	0.79	C	0.64	B
Peabody & Hume			0.97	E	0.97	E
Leisure Town & Orange			1.12	F	0.86	D
Depot & E. Monte Vista	0.85	D	0.92	E	0.92	E
Nut Tree & Orange			0.53	A	0.53	A
Allison & Nut Tree Parkway [New Ramps]			1.02	F	0.72	C
					[0.77]	C

* Assumes Current General Plan Intersection Geometrics.

LOS = Level of Service

V/C = Volume to Capacity

56065T9.XLS

designated major intersections, the City should adopt a policy that would restrict or eliminate driveway access within 60 feet of the intersection on all arterial approaches. This policy would increase the capacity of the intersection.

Special Study Areas

Figure 7 identifies three areas as "Special Study Areas". These are areas where projected traffic volumes are such that the planned roadways will operate at low LOS. All of these areas need to be studied in more detail to determine appropriate mitigation and are beyond the scope of the General Plan Update Study. The three areas and the critical intersections in those areas are as follows.

I-80/Leisure Town Road: Special Study Area

Leisure Town Road/Orange Drive
Leisure Town Road/I-80 Westbound Ramps
Leisure Town Road/I-80 Eastbound Ramps

Options for the Leisure Town Road/I-80/Vaca Valley Parkway intersection need to be considered. The Orange Drive extension east of Leisure Town Road should be studied further; by not extending Orange Drive, the intersection will operate at a more acceptable LOS.

E. Monte Vista Avenue/I-80: Special Study Area

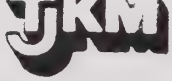
Nut Tree Overcrossing/E. Monte Vista Avenue
E. Monte Vista Avenue in front of the Nut Tree
Browns Valley Parkway/E. Monte Vista Avenue
I-80 Westbound Ramp/E. Monte Vista Avenue

East Monte Vista Avenue has very limited additional ROW in front of the Nut Tree and will not be able to carry projected volumes at an acceptable LOS. Alternatives need to be investigated in this study area.

Allison Drive/I-80: Special Study Area

Harbison Drive/Nut Tree Parkway
Allison Drive/E. Monte Vista Avenue
Allison Drive/Nut Tree Parkway

Projected eastbound Nut Tree Parkway and eastbound I-80 trips will not be accommodated at an acceptable LOS. An alternative eastbound I-80 on ramp needs to be studied in comparison to the planned roadway configurations.



APPENDIX A

APPENDIX A

The following is excerpted from
"A TRAFFIC MODEL FOR SMALL CITIES"

Traffic Quarterly, July, 1962
(A layperson's guide to how traffic models work.)

A traffic model is a mathematical statement of traffic movement based on observed relationships. Most models are based on empirical relationships which have established that the travel habits of individuals are similar and predictable, and that traffic flow between areas is related to the kind and intensity of development in those areas. Specifically, traffic models operate on the theory that trips are produced by persons living in a residential area and are attracted by various non-residential land uses. The strength of attraction varies directly with the intensity of development of the attracting land uses and indirectly with the time-distance between the attracting land use and the residential areas.

Commonly, the model is applied in this manner. The study area is divided into zones. Each zone is treated as producing and/or attracting trips. The production of trips by a zone is based on the number of trips to or from work, shopping, or "other". A zone attracts work trips based on employment, square footage, or acreage in the zone. Shopping trips are attracted on the basis of retail employment, retail sales, commercial floor area or commercial acreage in use in a zone. The attraction of other trips to a zone may be based on the number of dwelling units in the attracting zone, or the number of students enrolled in schools or colleges, etc.

External stations are established on the perimeter of the study area to deal with traffic moving into or out of the area.

All traffic flows, internal and external, are summarized and assigned to an existing or proposed street network, and an analysis is made of the ability and efficiency of the street network to carry the assigned traffic.

In order to test the reliability of the traffic model for a specific locality and, if necessary, to modify it before projecting future traffic, a model is prepared for the latest year for which land use data is available. Theoretical trip flow, simulated by the model and converted to vehicle trips, is then summarized on the existing street network. Counts are taken to determine actual traffic flows, and these are compared with theorized traffic. Adjustments to the model are not considered necessary if actual and theoretical volumes differ by less than 10 percent.

One of the drawbacks of traffic models is the time involved in assembling data needed for "input". It has become traffic model practice to divide the study are into zones having boundaries coterminous with census tracts (or with enumeration districts or census block groups) because the necessary land use, dwelling count, and employment inputs normally are tabulated and available by census tracts.

Some models deal with three or four types of trips (e.g., work, shopping, other-home-based, and non-home based) on a 24-hour basis. Some models consider only trips at peak hour. At peak hour, two types of trips predominate: 50 to 60 percent are trips to or from work, and 30 percent are non-work trips to or from commercial centers. Other-home-based (social) trips account for 20 percent of total daily traffic but only 10 percent of peak hour traffic; non-home-based trips, normally 15 percent of off-peak travel, account for only 5 percent of peak hour trips.

Time-distance between zones is the second factor in the distribution of trips. (Data on dwelling units, commercial floor space, and jobs make up the first factor.) Time-distance between zones is determined by inputting factors of roadway speeds, arterial network, and measured distances for individual roadway links. From the input data, the shortest time path from zone to zone is calculated. This method of shortest path calculation can be used for both daily and peak hour modeling and for existing and future conditions.

Models work best in closed systems (metropolitan areas or regions) where the volume of trips outside the study area is minor compared with the volume of trips within the study area. In those instances, external trips often will not affect the design of the traffic way's system and can be ignored. Where a model is applied to a study area that is less than a closed system, external traffic must be accounted for, summarized and distributed along with the internal trips. Since only the internal trips can be projected by the model, the external traffic information will be taken from similar model projections for county traffic way's.

All vehicle trips (except intra-zonal trips) are summarized on the existing or projected road network. These include internal, internal-to-external, and external (through) trips.

Some cautions are necessary in using any traffic model. The model is not an exact tool. It is not intended to be. It is intended for use during the preparation of master plans to test proposed road networks and to establish an "order of magnitude" of traffic needs. The basic data inputs often are sketchy and incomplete. The assumptions used are often imperfect.

The model is least accurate in areas of low-intensity development where there are larger zones, more trips per dwelling unit but fewer total trips, and many possible paths. Smaller zones increase accuracy. The model sometimes breaks down near the perimeter of the study area because of the relatively greater importance of external traffic flows near the perimeters.

Streets in the same corridor that allow different travel speeds once presented a problem in distributing trips: the higher-speed streets attracted traffic beyond reasonable capacities, while slower-speed streets remained unused. Today's models use constraints and friction factors to overcome that weakness.

Naphtali H. Knox, AICP

April, 1962 and September, 1985

APPENDIX A
DEFINITION OF TECHNICAL TERMS

Calibrate/Calibration: The process in which the traffic model is tuned to the special characteristics (traffic and trip generation) of the study area. This is done by attempting to have the model traffic volume projections "match" actual traffic volumes on roadways in the study area.

Gravity Model: A method of distributing trips based on the theory that trips are produced by persons living in a residential area and are attracted by various non-residential land uses. The strength of attraction varies directly with the intensity of development of the attracting land uses and indirectly with the time-distance between the attracting land use and the residential areas.

Level of Service (LOS): The level of service classification system is a scale which ranks street, highway, and intersection operations based on the amount of traffic and traffic operations. A complete description of the system is included in the Highway Capacity Manual (Special Report 209) Highway Research Board, 1985. Briefly, the level of service ranking system is a scale with a range of A through F. Level A represents free-flow conditions and Level F represents jammed or capacity conditions. (See Table B-1 in Appendix B)

Volume-to-Capacity (V/C)Ratio: This is a comparison of the actual or projected traffic volume on a roadway or at an intersection to the total capacity of the roadway or intersection.

Right-of-way (ROW): The total street width needed to accommodate, travel lanes, sidewalks and curb, and gutters.

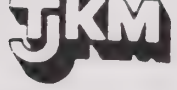
Transportation System Management (TSM): TSM includes programs to reduce single occupancy vehicle travel. Programs include: Carpools, vanpools, park and ride lots, transit, bicycle facilities, parking restrictions, flex-time, work hours, and pedestrian facilities. To encourage bicycle and pedestrian use shower facilities at work can be provided. TSM programs are most effective in large office and industrial areas or large employment centers.

TABLE A-1
LEVEL OF SERVICE FOR URBAN AND SUBURBAN ARTERIAL STREETS

LEVEL OF SERVICE	DESCRIPTION	VOLUME TO CAPACITY RATIO*
A	Free flow. Very slight or no delay. If signalized, conditions are such that no approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Turning movements are easily made, and nearly all drivers find freedom of operation.	0.00-0.60
B	Stable flow. Slight delay. If signalized, an occasional approach phase is fully utilized. Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles. This level is suitable operation for rural design purposes.	0.61-0.70
C	Stable flow. Acceptable delay. If signalized a few drivers arriving at the end of a queue may occasionally have to wait through one signal cycle. Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	0.71-0.80
D	Approaching unstable flow. Tolerable delay. Delays may be substantial during short periods, but excessive back-ups do not occur. Maneuverability is severely limited during short periods due to temporary back-ups.	0.81-0.90
E	Unstable flow. Intollerable delay. Delay may be great, up to several signal cycles. There are typically long queues of vehicles waiting upstream of the intersection.	0.91-1.00
F	Forced flow. Excessive delay. Intersection operates below capacity. Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	Varies*

Highway Capacity Manual, Special Report No. 209, Transportation Research Board, 1985.
Highway Capacity Manual, Special Report No. 87, Highway Research Board, 1965.
TJKM.

* In general, volume-to-capacity (V/C) ratios cannot be greater than 1.00, unless the lane capacity assumptions are too low. Also, if future demand projections are considered for analytical purposes, a ratio greater than 1.00 might be obtained, indicating that the projected demand would exceed the capacity.



APPENDIX B

APPENDIX B

SPECIFIC ASSUMPTIONS FOR THE VACAVILLE MODEL

This section will define specific assumptions and methodology used in the Vacaville City traffic model. These include roadway network and land use network files and trip generation equations. This chapter is meant to bridge the gap between the theories in the "MINUTP" users manual and practical uses of the model. Forms for various data files and examples of job streams files needed to run the Vacaville Model have been included at the end of this Appendix.

Network

The network files include information on the links, capacity (vehicles per lane per hour), average travel speeds (miles per hour), length (miles), originating node (A), destination node (B), number of lanes in one direction and if the link is one way or two way. A description of all of these variables are included in the "MINUTP" users manual NETBLD section. A sheet that can be used to enter data to build a network is included in at the end of this appendix.

In the Vacaville model the zone numbers begin at 1 and go to 400. Currently the numbers from 271 to 400 are unused to allow for future expansion of the model. However, expansion of the model is not limited to those 46 zones. The external cordon numbers begin at 401 and currently end at 419.

The network nodes start at 420 and currently end at 999. Any additions to the network can be accomplished by either connecting two existing nodes by a new link or by adding a new node or nodes to the network and connecting those together with new links.

The network data work sheets should be used to add new links to the data file. The VACA07.DAT file should be called up on the computer and the new link edited using a word processing program. The procedure for deletions or changes (link speed/capacity, etc.) to the network are done in the same way as additions.

The classification of each of the existing and future roadways in the study is shown on Figure 4. The capacity used for each classification is shown on Table VI. The capacities were taken from the 1985 Highway Capacity Manual and modified for conditions in Vacaville. Factors such as on-street parking, driveways, speeds, and intersection spacing were included.

For each new node added to the network, it is necessary to determine the nodes' X-Y coordinates and add those to the X-Y coordinate file. A plot of the existing roadway network with the X-Y grid on it has been provided to the City. The X-Y coordinates are only needed to plot the network and do not affect the assignment of traffic.

Land Use

The land use file includes data on the type of use, the quantity of use, and if the land use is an attraction or production use. To limit intra-zonal trips (trips staying in the zone) and obtain better modeling results, most traffic zones are formed with only one type of land use.

Land use data is broken down into several categories in a many-tiered system. Figure B-1 shows this system and the interrelation of source of the uses.

The Vacaville traffic model is broken down into 8 types of production uses and 13 attraction uses. See Table B-I for a list of the land uses in each category. Land use information is entered or changed in the "MINUTP" land use file (LODI08.DAT) by determining if the use is an attraction or production use, what land use category it fits into, which traffic zone it is in, and the appropriate land use quantity. At the end of this appendix is a land use data entry form which helps in entering or changing land use data.

After filling out the land use data sheet with the additions or changes to the traffic zones, these revisions can be made to the computer data file.

The process of changing the land use files is mostly straight forward. The only exception is in the non-home based category in the production uses. A detailed description of the non-home based category and how it is determined is included in a following section.

Because the values in the land use files must be integers, the attraction land use quantity was multiplied by 10 to get land use quantity accuracy to the nearest one-tenth of an acre. With this increase in land use quantities, it was necessary to divide the attraction trip generation rates by 10 to get the correct trip generation values. The trip generation rates located in the job stream file (VACA00.DAT) can be a decimal number.

TABLE B-I
LAND USES IN PRODUCTION/ATTRACTION CATEGORIES

CODE	LAND USE DESCRIPTION	TRIP UNITS (PER)
PRODUCTION USES:		
101	Single-Family Residential Low Income	DU
102	Single-Family Residential Medium Income	DU
103	Single-Family Residential High Income	DU
104	Medium-Density Residential	DU
105	High-Density Residential	DU
106	Mobile Home	DU
107	Retirement Residential	DU
108	Non-Home Based*	NO UNITS
ATTRACTION USES:		
201	Office	ACRE
202	Light Industrial	ACRE
203	General Industrial	ACRE
204	General & Neighborhood Commercial	ACRE
205	Downtown Commercial	ACRE
206	Highway Commercial	ACRE
207	Service Commercial	ACRE
208	Public Office & Civic Center	ACRE
209	Parks & Public Facilities	ACRE
210	Elementary/Junior High School	STUDENT
211	High School	STUDENT
212	Open Space/Agricultural	ACRE
213	Hospital/Church	ACRE

*** See discussion of non-home based trips.**

After setting up the land use files, it is then necessary to formulate the trip generation rates and internal/external-internal/internal splits by trip purpose to be used in the TRPGEN program of the MINUTP model. This process is fairly complicated and is not defined in the MINUTP Users Manual. After the trip generation rates for each land use have been defined (see Table II) and quantities (dwelling units, acres, etc.) have been calculated for each land use, then it is necessary to calculate the total trip generation for both production and attraction uses by trip purpose. Tables B-II and B-III show this breakdown for the traffic model.

TABLE B-II

PRODUCTION TRIP GENERATION

LAND USE	TRIP GENERATION	HOME-WORK	HOME-OTHER
All Residential	0.9 X TGR	0.50	0.50
Non-home Base	0.05 X TGR Attraction Uses		

NOTE: The percent of trip-by-trip purpose was determined from the Transportation and Traffic Engineering Handbook, Second Edition, and previous work completed by TJKM.

TGR = Trip Generation Rate.

Internal/external - internal/internal splits for attractions and productions by trip purpose are calculated from information on production and attraction uses external to the study area, the amount of attractions/productions within the study area, and the distances drivers are willing to travel to satisfy their needs for each trip purpose. The calculation process is an interactive process.

The total number of work productions are compared to the total number of work attractions and a reasonable percentage of work production trips that can be satisfied by the number of work attractions within the study area is estimated. This estimate is done while also keeping in mind that people will generally drive 30 to 50 percent further for a work trip than other trips. (Source: Transportation and Traffic Engineering Handbook.)

An example of this calculation follows: In the City of Vacaville study there were about 7,200 work productions and 4,800 work attractions in the existing model. Based on the relative proximity of large employment centers in Fairfield, the Bay Area, and Sacramento, it was estimated that about 60 percent of the Vacaville work production trips would stay within the City and 40 percent would go elsewhere.

From that, the calculation of the internal/external -internal/internal split for the attraction trips is relatively easy. The number of attraction internal/internal trips are

the same as the number of internal/internal trips for the production trips. Thus, the remaining attraction trips are the internal/external trips.

This method of internal/external - internal/internal split calculation is the same for all trip purposes. The only difference is that shopping and other purposes (social, recreational, school, personal business, etc.) generally are much shorter trips and, thus, a larger number stay within the study area. For example, in Vacaville it was estimated that 85 percent of the production shopping and other trips were assumed to be satisfied within the City.

Non-home based trips represent a special type of trip purpose. This type of trip is normally a trip from work to shopping, shopping to a restaurant, etc.

To model non-home based trips, it is necessary to include some way of generating production trips for attraction (non-home) land uses. This has been accomplished by determining the total number of non-home based trips for both attractions and productions. Tables B-II and B-III show the trip generation equations used to determine the non-home based trips in the Vacaville study area. The quantity of land use per traffic zone by land use type was determined from the following equation:

$$TG_{unit} = T_I \times NHB \times L_{tz}$$

WHERE:

TG_{unit}	=	Trip generation quantity (no units).
T_I	=	Total trip generation for a single attraction land use type.
NHB	=	Non-home based total trip generation.
L_{tz}	=	Land use quantity per traffic zone.

The trip generation rate for non-home based productions was assumed to be 1.0 trip end per unit.

To account for home-to-home trips, a factor was used to assign home-based trips to the "other" attraction trip generation equation. For this study, 0.1 trip ends per dwelling unit was used. This rate was multiplied times the total number of dwelling units within the study area.

Figure B-1 shows the data that was used to calculate the internal/external - internal/internal splits. With the calculated internal/external - internal/internal splits

by trip purpose, trip generation rates and percentage of home-based trips by trip purpose it is possible to calculate the production and attraction of trip generation equations.

TABLE B-III
ATTRACTION TRIP GENERATION
(PERCENT OF TRIPS)

	Equation No. 1	Equation No. 2	Equation No. 3	Equation No. 4
Trip Purpose	Work	Other	Non-home Based	Productions
Residential	0	10	0	90
Office	90	0	5	5
Industrial				
Light	90	0	5	5
Heavy	90	0	5	5
Commercial				
Light	10	80	5	5
Downtown	10	80	5	5
General	10	80	5	5
Shopping Center	10	80	5	5
Public				
I	30	60	5	5
II	0	90	5	5
Open Space/ Agriculture	0	90	5	5
Public School				
Elementary/Jr. High	0	90	5	5
High	0	90	5	5
Church	0	90	N[jpmqy 5	5

Note: To get total trip generation by trip category, multiply trip generation rate by above percentages and by total land use quantity in each land use category.

Peak Hour Analysis

Peak hour traffic was used in this study to provide the best analysis tool for determining future traffic volumes on Vacaville City streets and appropriate improvements to the street system. The peak hour capacity of a roadway is much easier to quantify than the 24-hour or daily capacity. Thus, it is easier to determine deficiencies in the system.

The p.m. peak hour was chosen as the time period to be analyzed. The p.m. peak hour generally has the highest street traffic volumes on a system-wide basis. However, some streets have higher traffic volumes in other hours of the day. These impacts will be missed by the p.m. peak hour model, but the number of streets that have other peak hours are small.

The "MINUTP" model is written to default to a 24-hour or daily model. To make it a peak hour model that functions correctly, the MATBAL module's default values of 50 percent inbound trips and 50 percent outbound trips needed to be modified by trip purpose to account for the inbound/outbound splits expected during a peak hour. Table B-IV shows the splits used in this study.

TABLE B-IV

P.M. PEAK HOUR INBOUND/OUTBOUND SPLITS

TRIP PURPOSE	INBOUND	OUTBOUND
Work	30%	70%
Other	50%	50%
Non-home Based	41%	59%
External-Internal	80%	20%
Internal-External	20%	80%

To enhance the accuracy of the model, small zones, a detailed network, and peak hour volumes were used. However, this type of model does create a problem with the "MINUTP" model process. This occurs during the trip distribution phase of the model. The small zones (and larger numbers of zones), lower trip generation associated with a peak hour and the "MINUTP" model's inability to store non-integer values (such as a fraction of a trip) in the matrix result in truncation of some of the zonal trip generation values to zero. Because of this, the model will assign less than the correct volume to the network.

To correct this problem, the trip generation matrix for each trip purpose was multiplied by 100 prior to the trip distribution (TRPDST) module. These inflated values were also carried through the MATRIX, MATBAL and ASSIGN modules. The capacity figures were also increased by a factor of 100 to yield a true volume-to-capacity ratio. The traffic volumes assigned to the network are therefore high by a factor of 100 and, therefore, were divided by 100 prior to plotting in the NETPLT module.

External-External Travel

External-external travel is traffic that may use roadway facilities in the study area but does not have a destination or origination in the study area. Existing external-external traffic was determined from Caltrans and the City of Vacaville traffic counts and reduced by traffic from the study area. Future external-external traffic volumes were determined by using a growth rate for freeway, state highway, and City roadways based on historical growth trends.

External-external traffic is added to the model in the MATRIX module of the program. This is done by directly adding the external-external volumes to those volumes generated by the study through a MOD statement. A MOD statement is used for each of the cordon stations where external-external travel is expected. The volumes need to be assigned with a MOD statement for each direction of travel where applicable.

Appendix 12

California Archaelogical Inventory Bibliography

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Glossary

GLOSSARY

This glossary is intended to serve the Plan and EIR, and contains terms used in both.

ABAG. Association of Bay Area Governments.

Acceptable Risk. Given that certain natural hazards exist in Vacaville, it is necessary to decide whether the risks these hazards present are acceptable or whether action is necessary to reduce the level of risk. The Council on Intergovernmental Relations (CIR) defines "Risk" from natural and man-made hazards in three categories:

1. Acceptable Risk: The level of risk below which no specific action by government is deemed to be necessary.

2. Unacceptable Risk: The level of risk above which specific action by government is deemed to be necessary to protect life and property.

3. Avoidable Risk: A risk which need not be taken because individual or public goals can be achieved at the same, or less, total "cost" by other means without taking the risk.

The central concept used in determining levels of acceptable risk is the definition of natural events in terms of magnitude and frequency. The magnitude of an event refers to its size. The frequency of an event refers to the number of times it occurs during a certain period of time.

The magnitude-frequency concept is involved in decisions regarding acceptable risk in that the community must judge what magnitude event should be planned for. That judgment is based on the frequency or recurrence interval of the hazardous event. A description of the magnitude and other characteristics of the event are developed through a technical analysis.

Acoustical Engineer. An engineer specializing in the measurement and physical properties of sound. In environmental review, the acoustical engineer measures noise impacts of proposed projects and designs measures to reduce those impacts.

Acre Foot. The volume of water that would cover one acre to a depth of one foot. An acre foot is about the amount of water used each year in and around the home by two average California families.

ADT. Average daily traffic.

ADWF. Average Dry Weather Flow.

Affordability, Housing. The relation of housing costs to household income.

Affordable Housing. Dwelling units for which the housing payment is not more than 30 percent of household gross income for a specified income group.

Agricultural Service Zone. A geographic area delineated in the General Plan where no urban development is to occur, and services are available only for agricultural and related uses.

Alluvial. Pertaining to or composed of alluvium, or deposited by a stream or running water.

Alluvium. A general term for clay, silt, sand, gravel, or similar unconsolidated detrital material deposited during comparatively recent geologic time by a stream or other body of running water as a sorted or semi-sorted sediment in the bed of the stream or on its flood plain or delta, or as a cone or fan at the base of a mountain slope.

ALUC. Airport Land Use Commission.

Apartment-type Units. Garden-type apartments or condominiums, generally at densities of 14 units per acre or more, designed as stackewd units without garages.

APCD. Air Pollution Control District.

AQMP. Sacramento Air Quality Maintenance Plan.

Army Corps of Engineers. A federal agency responsible for the design and implementation of publicly-supported engineering projects; any construction activity that involves filling a watercourse, pond, lake (natural or man-made), or wetlands (including seasonal wetlands and vernal pools), may require an Army Corps permit.

Artificial Groundwater Recharge. The process whereby water in an aquifer (a waterbearing stratum of permeable rock, sand, or gravel) is artificially replenished.

Bedrock. The solid rock underlying unconsolidated surface materials.

Bike Lane. A corridor expressly reserved by markings for bicycles, existing on a street or roadway in addition to any lanes for use by motorized vehicles (Class 2 Bikeway).

Bike Path. A paved route not on a street or roadway, expressly reserved for bicycles. Bike paths may parallel roads but typically are separated from them by landscaping (Class 1 Bikeway).

Bike Route. A facility shared with motorists and identified only by signs. A bike route has no pavement markings or lane stripes (Class 3 Bikeway).

BMR. Below Market Rate. BMR housing is subsidized to make it available to households that cannot afford current market price.

Borings. The process of making a hole in the earth and extracting material for analysis of its composition. By generalizing a finding over a wider area, it is possible to determine the relative stability of a site.

Buildout. That level of urban development characterized by full occupancy of all developable sites in accordance with zoning regulations; the maximum level of development envisioned by the Town's General Plan and implementing programs.

CAI. California Archaeological Inventory.

Caltrans. California Department of Transportation.

Capital Improvement Program (CIP). The multiyear scheduling of public physical improvements based on studies of fiscal resources available and the choice of specific improvements to be constructed.

Carbon Monoxide. An odorless, colorless gas formed by the incomplete combustion of fuels; roughly 80 percent of Bay Area CO emissions are estimated to be from motor vehicles.

CDBG. Federal Community Development Block Grant.

CDMG. California Department of Mines and Geology.

CEQA. California Environmental Quality Act, 1979.

City. The City of Vacaville.

Colluvium. (a) A general term applied to any loose, heterogeneous, and incoherent mass of soil, material or rock fragments deposited chiefly by mass-wasting, usually at the base of a steep slope or cliff. (b) Alluvium deposited by unconcentrated surface runoff or sheet erosion, usually at the base of a slope.

Community Noise Equivalent Level (CNEL). A 24-hour energy equivalent level derived from a variety of single-noise events, with weighting factors of 5 and 10 dBA applied to the evening (7:00 to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) periods, respectively, to allow for the greater sensitivity to noise during those hours. An alternative measure is day-night average sound level (Ldn). The A-weighted average sound level for a given area (measured in decibels) during a 24-hour period with a 10dB weighting applied to nighttime sound levels. The Ldn is approximately numerically equal to the CNEL for most environmental settings.

Community Separator. Land designated as open space in order to avoid corridor-style urbanization and retain the character of free-standing cities.

Conservation. The management of natural resources to prevent waste, destruction, or neglect.

Culvert. A drain, ditch or conduit not incorporated in a closed system that carries drainage water under a driveway, roadway, railroad, pedestrian walk or publicway. Culverts are often built to channelize streams and as part of flood control systems.

DE Plant. Diatomaceous Earth Water Treatment Plant.

Decibel (dB). A unit used to express the relative intensity of a sound as it is heard by the human ear. The decibel measuring scale is logarithmic. Zero (0 dB) on the scale is the lowest sound level that a normal ear can detect under very quiet ("laboratory") conditions and is referred to as the "threshold" of human hearing. On the logarithmic scale, 10 decibels are 10 times more intense, 20 decibels are 100 times more intense, and 30 decibels are 1,000 times more intense than 1 decibel. See also Decibel "A-Weighted."

Decibel "A-Weighted" (dBA). The scale for measuring sound in decibels that weights or reduces the effects of low and high frequencies in order to simulate human hearing. See also Decibel.

DEIR. Draft Environmental Impact Report.

Density, Base. The allowable density range for a General Plan land use classification, excluding any density bonus.

Density Bonus. An increase in allowable density above base density granted in exchange for provision of affordable or senior housing.

Density, Net. The number of dwelling units per acre of developable residential land designated on the *General Plan Diagram*, exclusive of public and private streets, drainage, power-transmission-line easements, or other public and semipublic uses.

Design Review. The process whereby projects are reviewed for compliance with established design guidelines.

Development Fees. Direct charges or dedications collected on a one-time basis for a service provided or as a condition of approval being granted by the local government. The purpose of the fee or exaction must directly relate to the need created by the development. In addition, its amount must be proportional to the cost of the service or improvement. Fees can be broken down into two major classes: 1) service charges such as permit fees covering the cost of processing development plans, connection or standby fees for installing utilities or application fees for reviewing and considering development proposals; and 2) "impact" fees levied on new development to cover the cost of infrastructure or facilities necessitated by development.

DFG. State of California, Department of Fish and Game.

DUSD. Dixon Unified School District.

Dwelling Unit (du). A building or portion of a building containing one or more rooms, designed for or used by one family for living or sleeping purposes, and having a separate bathroom and only one kitchen or kitchenette.

Ecotone. A transition area between two adjacent ecological communities usually exhibiting competition between organisms common to both; often a rich biological area.

EIR. Environmental Impact Report.

EMS. Emergency Medical Services.

Endangered Species, California. A native species or sub-species of a bird, mammal, fish, amphibian, reptile, or plant, which is in serious danger of becoming extinct throughout all or a significant portion of its range, due to one or more factors, including loss in habitat, change in habitat, over-exploitation, predation, competition, or disease. The status is determined by the State Department of Fish and Game together with the State Fish and Game Commission.

Endangered Species, Federal. A species which is in danger of extinction throughout all or a significant portion of its range, other than the species of the Class Insecta determined to constitute a pest whose protection under the provisions of the 1973 Endangered Species Act, as amended, would present an overwhelming and overriding risk to humans. The status is determined by the U.S. Fish and Wildlife Service and the Department of the Interior.

Environmental Impact Report (EIR). A report on the effect of a proposed development proposal or other major action which would significantly affect the environment. The report consists of an inventory of existing environmental conditions, projected impacts of development, and mitigation for significant adverse impacts. A general plan EIR is necessarily more general than a site-specific EIR.

Epicenter. That point on the Earth's surface which is directly above the focus of an earthquake.

Erosion. The process by which soil and rock are detached and moved by running water, wind, ice, and gravity.

Excess Firm Capacity. The difference between peak day demand and firm capacity; the amount of uncommitted water that could serve aditional development.

FAR. Floor Area Ratio. The ratio between gross floor area of structures on a site and gross site area.

Fault. A surface or zone of rock fracture along which there has been displacement, from a few centimeters to a few kilometers in scale.

Federal Candidate Species, Category 1 (Candidate 1). Species for which the U.S. Fish and Wildlife Service has sufficient biological information to support a proposal to list as Endangered or Threatened.

Federal Candidate Species, Category 2 (Candidate 2). Species for which existing information indicates that these species may warrant listing, but for which substantial biological information to support a proposed rule is lacking.

Federal Flood Insurance. Affordable flood insurance offered by the federal government to property owners whose communities participate in the National Flood Insurance Program. Santa Rosa is a participant.

FEIR. Final Environmental Impact Report.

FEMA. Federal Emergency Management Agency.

Firm Capacity. The amount of water available assuming the water treatment plant is operating at 95 percent capacity and the largest well is not in operation.

Floor Area, Gross. The total horizontal area in square feet of all floors within the exterior walls of a building, but not including the area of unroofed inner courts or shaft enclosures.

Franciscan Melange. A thick zone of small to very large hard rocks embedded in more or less intensely sheared and crushed rock material, formed by an ancient fault which is no longer active.

FSUSD. Fairfield-Suisun Unified School District.

General Plan. A comprehensive, long-term plan mandated by State Planning Law for the physical development of the city and any land outside its boundaries which, in its judgment, bears relation to its planning. The plan shall consist of seven required elements; land use, circulation, open space, conservation, housing, safety, and noise. The plan must include a statement of development policies and a diagram or diagrams illustrating the policies.

Greenhouse Effect. The gradual warming of the earth's atmosphere attributed to the accumulation of gases caused by industrial and agricultural activities. Associated phenomena include the melting of the polar ice caps and rising sea levels.

Groundwater Recharge. The process whereby water in an aquifer, a water-bearing stratum of permeable rock, sand, or gravel, is replenished; this procedure occurs naturally, unless interrupted by human activity.

Habitat. The natural environment of a plant or animal.

Hazardous Waste. Waste which requires special handling to avoid illness or injury to persons or damage to property. Includes, but is not limited to, inorganic mineral acids of sulfur, fluorine, chlorine, nitrogen, chromium, phosphorous, selenium and arsenic and their common salts; lead, nickel, and mercury and their inorganic salts or metallo-organic derivatives; coal, tar acids such as phenol and cresols and their salts, and all radioactive materials.

High Density Residential. 14.1 to 20 units per gross acre.

High Occupancy Vehicle Lanes (HOV). Traffic lanes that are permanently or periodically restricted by law to vehicles with two, three, or more occupants.

Household. Person or persons living in one dwelling unit.

Housing Payment. For ownership housing, this is defined as the mortgage payment, property taxes, and insurance and utilities. For rental housing this is defined as rent and utilities.

Housing Unit, Multifamily. A dwelling other than a single-family housing unit.

Housing Unit, Single-Family. Detached or attached units, provided no unit shares a wall with more than two other units and there are no housing units above or below. A single-family housing unit shall have private outdoor living space.

Impervious Surface. Any material which reduces or prevents absorption of water into land.

Income, Above-Moderate. A household whose income exceeds 120 percent of the county median.

Income, Low. A household whose income is between 50 and 80 percent of the county median.

Income, Median. The county-wide median income for a four-person household, as defined by the United States Department of Housing and Urban Development and the California Department of Housing and Community Development.

Income, Moderate. A household whose income is between 81 and 120 percent of the median family income for the county.

Income, Very-Low. A household whose income does not exceed 50 percent of the median family income for the county.

Infill. The development of new housing or other buildings on scattered vacant lots in a built-up area or on new building parcels created by permitted lot splits.

Inversion. Temperature inversions limit the amount of vertical mixing of air and thus trap pollutants in the lower atmosphere where people breathe. Inversions are characterized by a layer of warmer air above a layer of cooler air, a reversal of the normal decline in temperature with increasing altitude.

Jobs/Housing Balance. A ratio used to describe the adequacy of the housing supply within a defined area to meet the needs of persons working within the same area. Jobs/housing balance as used in the General Plan is the ratio of jobs to employed residents within the Vacaville Planned Urban Service Zone.

Landslide. The downslope movement of soil and rock.

Level of Service (LOS). Calculated on the basis of a volume-to-capacity ratio, the level of service classification system is a scale which ranks street, highway, and intersection operations based on the amount of traffic and traffic operations. A complete description of the system is included in the Highway Capacity Manual (Special Report 209) Highway Research Board, 1985. Briefly, the level of service ranking system is a scale with a range of A through F. Level A represents free-flow conditions and Level F represents jammed or capacity conditions.

Liquefaction. A sudden large decrease in the shearing resistance of a cohesionless soil, caused by a collapse of the structure by shock or strain, and associated with a sudden but temporary increase of the pore fluid pressure.

Local Agency Formation Commission (LAFCO). A commission that acts on all proposals for incorporation of cities, annexation to cities or special districts, consolidation of districts, formation of special districts, and merger of districts with cities. (See also Sphere of Influence.) By law, the *Local Agency Formation Commission* is composed of two members of the county Board of Supervisors, two members of city councils of cities in the county, and one member who represents the general public.

Low-Density Residential. 3.1 to 5 units per gross acre.

Low-Medium Density Residential. 5.1 to 8 units per gross acre.

Medium-Density Residential. 8.1 to 14 units per gross acre.

Midden. Refuse heap. In the San Francisco Bay Area midden is composed primarily of shells and shell fragments piled in great mounds by early Native American inhabitants.

Mitigation. A specific action taken to reduce environmental impacts to insignificant levels. Mitigation measures are required as a component of an environmental impact report (EIR).

Multifamily Housing. See Housing Unit, Multifamily.

NBA. North Bay Aqueduct.

NBR Plant. North Bay Regional Water Treatment Plant, a joint facility, constructed by Vacaville and Fairfield.

Nitrogen Dioxide (NO_2). A reddish brown gas that is a byproduct of the combustion process and is a key to the ozone production process.

Noise Contour(s). Isolines (a line on a map or chart along which there is a constant value) representing noise, measured in decibels, from selected representative points within the City.

Non-point Source. A pollutant source introduced from dispersed points and lacking a single, identifiable origin. An example is automobile emissions.

100-year Flood. That flood event which has a one percent chance of occurrence in any one year.

Open Space. Any parcel or area of land or water which is essentially unimproved and devoted to an open-space use as defined in the General Plan or designated on a local, regional, or state open-space plan as one of the four types of open space defined in State Planning Law.

Operating Capacity (Schools). Number of students that can be accommodated both in classrooms in permanent buildings and classrooms in portable or temporary facilities.

Oxidant. The production of photochemical reactions in the atmosphere between reactive organic gases and oxides of nitrogen.

Ozone. An oxidant, O_3, that makes up the largest single portion of smog.

Parcel. A lot or tract of land.

Particulate Matter. Minute, separate airborne solid or liquid particles including smoke, dust, aerosols, metallic oxides, and pollen.

Peak Day (Water Use). The day of highest demand during the year.

Peak Hour Traffic. The number of vehicles passing over a designated section of a street during the busiest one hour period during a 24-hour period.

Permanent Capacity (Schools). Number of students that can be accommodated in classrooms within permanent buildings, excluding classroom space in portable or temporary facilities.

Planning Area. The Vacaville Planning Area is the 100 square-mile area indicated on the General Plan Diagram. The Planning Area includes an agricultural service zone and an urban service zone.

Point Source. A source of pollutants which may be traced to a point of emissions.

Policy Plan. A detailed plan that includes the text and maps or diagrams generally specifying the following for a portion of the area covered b the General Plan:

1. Land use;
2. Distribution, location, and extent and intensity of major components of public and private transportation, sewage, water, drainage, solid waste disposal, energy, and other essential facilities;
3. Standards and criteria by which development will proceed; and
4. A program of implementation measures including regulations, programs, public-works projects, and financing measures.

Population Holding Capacity. The population that would result if all vacant land designated for residential use within the Urban Service Zone were built at the average density for the designated General Plan density category and the average household size in the city were 2.6.

Pump Station. A building or structure containing the necessary equipment to pump water to a higher level.

PWWF. Peak Wet Weather Flow.

Residential Estate. 0.5 to 3 units per gross acres.

Response Time. The amount of time for an emergency services response, measured from the time of the distress call until arrival on the scene.

Retention Area. A pond, pool, lagoon, or basin used for the storage of water runoff.

Right-of-Way. 1.) The total street width needed to accommodate, travel lanes, sidewalks and curb, and gutters. 2.) A strip of land acquired by reservation, dedication, forced dedication, prescription or condemnation, and intended to be occupied or usually occupied by a road, crosswalk, railroad, electric transmission lines, oil or gas pipeline, water line, sanitary storm sewer or other similar use.

Riparian Habitat. Land and plants bordering a water course.

Rural Residential. One unit per 2.5 to 10 acres (0.1 - 0.4 units per gross acre).

SACOG. Sacramento Area Council of Governments.

Sensitive Receptors. Members of the population who are most sensitive to air quality include children, the elderly, the acutely ill, and the chronically ill. The term "sensitive receptors" can also refer to the land use categories where these people live or spend a significant amount of time. Such areas include residences, schools, playgrounds, child care centers, hospitals, retirement homes, and convalescent homes.

SID. Solano Irrigation District.

Siltation. The process of silt deposition. Silt is a loose sedimentary material composed of finely divided particles of soil or rock, often carried in cloudy suspension in water.

Site. A place, scene, or point.

Slope Failure. The process, often sudden, in which a steep slope collapses, usually carrying along structures and vegetation.

Slope, 25%. A slope defined by twenty-five units of vertical elevation per one hundred units of horizontal distance, measured on a line perpendicular to contours of equal elevation.

Solid Waste. Unwanted or discarded material, including garbage, with insufficient liquid content to be free flowing.

Sphere of Influence (SOI). A boundary representing the probable ultimate physical extent and service area of a city or special district. The SOI boundary is established by the county Local Agency Formation Commission (LAFCO) in accordance with the 1972 Knox-Nisbet Act.

Street, Arterial. A major street carrying the traffic of local and collector streets to and from other major streets and expressways or freeways, with controlled intersections and direct access to some, but not all properties.

Street, Collector. A street for traffic moving between arterial and local streets, generally providing direct access to properties.

Street, Local. A street that provides the principal means of direct access to properties and is designed to discourage through traffic.

Study Area. A study area is designated where a land use category has not been assumed because information, plan proposals, or agreement are insufficient.

Subdivision. The division of a lot, tract, or parcel of land into two or more lots, tracts, parcels, or other divisions of land for sale, development, or lease.

Subdivision Ordinance. An ordinance which specifies the division of a lot, tract, or parcel of land into two or more lots, tracts, parcels or other divisions of land for sale, development, or lease.

Subsidence. The gradual sinking of land as a result of natural or man-made causes.

The "Project". In the EIR, the "Project" is "build-out in accord with Vacaville Draft General Plan."

The "No Project" Alternative. In the EIR, the "No Project" alternative evaluates existing conditions in the City.

Threatened Species, California. A native species or sub-species of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts required by Chapter 1.5 of the State Department of Fish and Game Code.

Threatened Species, Federal. A species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Topography. The configuration of a surface, including its relief and the position of its natural and man-made features.

Trailhead. The beginning of a trail, usually marked by information signs.

Transportation System Management (TSM). TSM includes programs to reduce single occupancy vehicle travel. Programs include: carpools, vanpools, park and ride lots, transit, bicycle facilities, parking restrictions, flex-time, work hours, and pedestrian facilities. To encourage bicycle and pedestrian use, shower facilities at work can be provided. TSM programs are most effective in large office and industrial areas or large employment centers.

Trip. A one-way journey that proceeds from one origin to one destination.

Trip, Person. A trip made by an individual.

Trip-Generation Rate. The number of vehicle trips per acre, per 1,000 square feet of floor area, per housing unit or other unit of measure during a 24-hour period. Measured trip-generation rates are used to project the impact of development on the traffic circulation system.

TSM. Transportation Systems Management measures to reduce the number of single-occupant vehicle trips during peak hours.

TUSD. Travis Unified School District.

Urban Service Zone: The City of Vacaville and adjacent land planned for urban use.

URBEMIS2. A computer program which projects carbon monoxide, nitrogen oxides, and organic gases production, based on projected land use and traffic levels.

V/C. The ratio of traffic volume to roadway capacity.

Vehicle Trip. A trip made by a vehicle (may equal one or more person-trips).

Vernal Pool. Restricted to small geographic areas, vernal pools occur where seasonal rains are retained long enough in depressions to allow specialized aquatic plants and animals to grow and reproduce, but not long enough to permit the development of a typical pond or marsh ecosystem.

Volume-to-Capacity (V/C) Ratio. This is a comparison of the actual or projected traffic volume on a roadway or at an intersection to the total capacity of the roadway or intersection.

VUSD. Vacaville Unified School District.

Waste Stream. All solid, semisolid and liquid wastes including garbage, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes.

Watershed. The total area above a given point on a watercourse that contributes water to the flow of the watercourse; the entire region drained by a watercourse.

Waterway. A natural waterway can support its own environment of vegetation, fowl, fish, and reptiles, and appears natural.

Wetlands. Includes the environments of subtidal mudflats, mudflats, tidal salt marsh, periodically inundated or brackish marsh, diked marshland, associated upland, and freshwater marsh.

Xeric. Vegetation requiring only a small amount of moisture.

YSAPCD. Yolo-Solano Air Pollution Control District.

Zoning District. A specifically delineated area or district within which regulations and requirements uniformly govern the use, placement, spacing, and size of buildings, open spaces, and other facilities.

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Zoning Ordinance. The local ordinance which divides a municipality into districts and establishes regulations governing the use, placement, spacing, and size of buildings, open spaces, and other facilities.

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